

The Emergence and Change of Pharmacia Biotech 1959–1995



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The Emergence and Change of Pharmacia Biotech 1959–1995

The Power of the Slow Flow and
the Drama of Great Events

Per Andersson



STOCKHOLM SCHOOL
OF ECONOMICS

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Foreword

This book is very much the result of a collective process, like all studies that claim to be part of social science. In one way, it could be said to be the outcome of research carried out within Pharmacia Biotech AB from 1991 to 1994 but in a wider sense, the process started long before that and has continued long after the draft manuscript was finished. Just as the story of Pharmacia Biotech AB is based on a network view of reality, so has the procedure of writing the story been a network process. During different phases of the process, the contacts and relations with people within Pharmacia, in the research community, and elsewhere, have constituted the research context. Some of these people have provided the all important stability and continuity throughout the whole process. The importance of this continuity and stable support can never be overstated. And it is specially important during those moments - which recur so often - when the whole process seems to be drifting in every possible direction. These stable contacts have contributed and shared in the evolution of the ideas, descriptions and contents, and their enthusiasm, knowledge and insight has proved a constant source of energy and inspiration, and also of fruitful tensions. The stable contacts have also been important in that they have indirectly linked me to important new contacts, within Pharmacia and in networks of academic researchers.

Although my role throughout the process has first and foremost been that of researcher, the different roles one has in the different contexts are not always easy to separate. In a study of the long-term development of the British company ICI one of the many important inspirations for this book, Andrew Pettigrew, describes his dilemma:¹

The mixed role that I have played in the company as a researcher, consultant, and trainer may also have helped me to gain access to people and appreciate situations and dilemmas in a wider fashion than if I had defined my role just as researcher, or a consultant, or a trainer. Effective, or merely adequate, research on any sphere of life has surely to be a mutual process where the need to balance involvement and distance is a critical part of the process.

¹Pettigrew, A., *The Awakening Giant - Continuity and Change in ICI*, Oxford: Basil Blackwell, 1985, p.XIV

My role in Pharmacia Biotech has first and foremost been that of researcher. On some occasions, for example when attending and participating in internal seminars and conferences, I have extended this role by providing ideas and suggestions based on my general experiences from prior research studies. Thus research of this kind, for obvious reasons, has to be a mutual process. The openness of the company's character has been invaluable in gaining access to the organization and its complex and sometimes problematic processes of organizational change. The study had not been possible to make without it. Like any long-term business relationship, my involvement in the organization has been based, I dare say, on mutual trust and confidence.

However, all network processes, including those social processes connected to doing long-term, organizational case studies, are not always so easy to predict. In this study of Pharmacia Biotech, important people who have been stable contacts for me and for the study, have left the organization for other jobs during the course of the process - sometimes before introducing me to successors or to other important persons in the company who could assist. Thus, the case study process has comprised many of the elements and characteristics of longitudinal organizational change processes: unforeseen problems and solutions appearing unexpectedly, progress and retrogression evolving side by side, tensions and lost opportunities, inertia, and rare moments when nothing seems able to hinder or stop the advancing work process. Recognizing the unequivocal fact that these would be the enabling and constraining circumstances of a study of this kind, I realized that stable contacts and relations were necessary both for the study, as such, as well as for giving me the introduction to people who were able to help me complete the story of Pharmacia Biotech.

I gained access to Pharmacia Biotech through Seppo Nilsen, who was my first link into the organization and who was a great help in enabling me to start and to continue the study. He introduced me to Arne Forsell whose support has been invaluable. Without Arne's support the study would not have been possible. Arne also read the manuscript in the later stages and provided detailed comments on the whole story. Others have read portions of it and have helped me refine certain parts of the story. The most important among these were Per Idberg, Christer Ullin, Jan Ehrneberg and Lars-Erik Utterman. Kjell Hedlöf was very helpful for the archival work and Marie Almquist has been important in providing me with names and contacts.

Special thanks are due to my team of advisers. Professor Lars-Gunnar Mattsson at the Stockholm School of Economics has given me support, confidence and inspiration before and throughout the study. Claes-Robert Julander at the Stockholm School of Economics

and Professor Lars-Erik Gadde at Chalmers University of Technology in Gothenburg have also given me valuable support and advice, especially during the final stages when everything is put together into one whole. I am also greatly indebted to my research colleagues at the Department of Marketing, Distribution and Industry Dynamics at the Stockholm School of Economics. Their comments and critiques have been very important in the process of completing the story of Pharmacia Biotech. A special thanks also to Alexandra Waluszewski at Uppsala University for her valuable comments on the case study during the later phases.

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I am also greatly indebted for the support and indispensable research funding which has been provided throughout the study by Torsten and Ragnar Söderbergs Stiftelser. The economic support from this Foundation has enabled me to continue and to complement this study. Important initial support and funding was provided by Mekanförbundet through the Marketing Technology Center in Stockholm. During this process research funding has also been provided by the International Motor Vehicle Program (Massachusetts Institute of Technology) and by Saab-Scania AB.

This case study is the empirical part of a study of industrial marketing change processes. It complements a separate analysis volume entitled "Concurrence, Transition and Evolution - Perspectives of Industrial Marketing Change Processes".

Stockholm in December, 1995

Per Andersson

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Prologue

As a result of long-term cooperation between researchers at the Institute of Biochemistry at Uppsala University and researchers at the Research Laboratories of Pharmacia, the well-established Swedish pharmaceutical company publishes a completely new method for laboratory separation called gel filtration in June 1959. The introduction of the new separation method is coupled with the launching of a new chemical product, Sephadex, and this marks the start of a radical shift in the history of the company. The company leaves the well-known terrains of pharmaceuticals and medical products and associated health care customers. Complementing the pharmaceutical and medical business, the launching of Sephadex directs Pharmacia into the laboratory product business and close contacts with academic researchers, initially biochemists, and research organizations all over the world. The start of production and sales of this chemical substance - a seemingly simple lump of gel - will result some thirty years later in a multinational company with an established position in the network of companies and organizations engaged in the new biotechnology.

After a whole row of successive name changes,¹ and building on the 1959 invention, Pharmacia Biotech AB is established in 1992 as a self-contained company within Pharmacia, specialized in the supply of equipment for the biotech industrial network. The event takes place in 1992, at the height of change in the marketing history of the emerging company. A multitude of interacting processes and events transform and radically change the established marketing and distribution structures, operations, norms and ideas. The combination and interconnectedness of multiple changes produce an organizational transformation whose outcome is difficult to comprehend and predict for any single change agent, even by those responsible for the change.

¹E.g. "The Sephadex Group" (1959), "Pharmacia Fine Chemicals" (1967), "Separation Products Division" (1982), "Pharmacia LKB Biotechnology" (1986), "Pharmacia Biotech" (1992)

With a focus on four of Pharmacia Biotech AB's marketing and distribution change processes during the turbulent period 1989-93, a period of transformation and radical change is spotlighted, when intersecting events point the biotech supply company's long-term processes of marketing change in new directions.²

A STRATEGIC REORGANIZATION AND REORIENTATION 1989

In a wider perspective, Pharmacia Biotech AB in the early 1990s becomes involved in the organizational context of the whole Pharmacia Group. This includes being allied to a major deal between Volvo and state-owned Procordia and the long-term restructuring of the Swedish pharmaceutical industry. Concurrently, the marketing changes evolve in the midst of the dynamic development of the global biotechnology industry.³

In the closer perspective, the rapid, and in parts unexpected, decrease in the demand for biotech supplies during 1989, contributes in prolonging a difficult merger process with LKB Produkter AB, started in 1986 and preceding the radical marketing reorganizations a few years later. In 1989, Pharmacia's Biotechnology Group (BTG) needs organizational stability. The merger continues, but faced with a maturing market and increasing competition, there is also a need to direct attention to customers, sales and the rapidly changing market situation. While the need for an overall organizational stability increases, the cumulative effects of the merger and a general lack of attention to internal efficiency matters - the control and use of resources - put pressures on the BTG organization to make further, and for the involved individuals, groups and divisions, radical changes in the internal organization. The company goes through a painful awakening, and to some in BTG the biotech supply company's rapidly changing role comes as a surprise. From being an R&D driven manufacturer, BTG is becoming an industrialized supplier among many. The role as one of the dominant, R&D driven biotech suppliers in the center of the global biotechnology sector is no longer as clear and evident as it once used to be.

Cost oriented and cost driven customers in laboratories as well as in industries demand "industrial" efficiency in the provision of services and equipment by suppliers. This is coupled with demands for more exact product outputs. The pressure to make radical efficiency improvements in marketing, distribution, production and product policies, and capital management increases while the pressure on effectiveness remains or is

²Here, like in the complementary analytical discussion, "radical change" is only defined from the points of view of the involved marketing change agents and their counterparts. For these actors, the changes described become a considerable break with prior, historical marketing traditions; the organizational and operational marketing traditions.

³Described in chapter 1

accentuated as customers' needs for exact and adapted solutions to their biotech related problems come in focus.

During this time, and as a consequence of the Volvo-Procordia deal, Pharmacia Biotech AB becomes part of a newly formed holding company, Pharmacia Biosystems AB. In addition, an after sales service project, a distribution project, and a regionalization project to radically reorganize the global net of marketing subsidiaries are started. As part of the regionalization project - partly leaving aside the old country based net of marketing subsidiaries - a new customer orientation focus results in the first attempts to implement a differentiated key account system. Against the historical background of the company's customer relations from 1959 and onwards, three concurrent, interacting processes summarize the strategic changes, changes in the company's customer orientation at the end of the 1980s:

1. Emerging relationships with new types of customers and new user situations
2. Changing relationships with existing customers
3. Internal differentiation and polarization of customer relations

Emerging relationships with new types of customers and new user situations

The genesis and expansion of the company in 1959 is reflected in a changing set of customer counterparts. The first relationships with academic biochemical research departments and laboratories is complemented at an early stage with relationships with a handful of production organizations in the food and pharmaceutical industries. Successively, the set of customer relations is extended to include pharmaceutical companies' R&D departments and laboratories, government control laboratories and clinical laboratories.⁴ In the 1970s, the number of relations with pharmaceutical production departments starts to rise. With the take-off of molecular biology research and the spin-off of private R&D companies from the industry and universities in the 1980s, a new set of customers are included. The number of customer relations rises steadily, but differ between Pharmacia Biotech AB's three main divisions.⁵ The complexity increases when more departments within the industrial pharmaceutical companies are added to the customer portfolio; despite the fact that the formal counterparts - the industrial companies - are the same, the lack of coordination between several customer contacts in different departments still in the late 80s often qualify them as "new".⁶ In the 1990s, the emerging

⁴For a detailed typology of the emerging set of customer relations during the late 1980s, and 90s, see Section IV in chapter 2 and the customer analysis made by the new After Sales Service Division.

⁵In Europe in 1991, the number of customers for the three company divisions were: BioProcess 900, Pharmacia LKB Biotechnology 12 000, Molecular Biology Group 7000.

⁶In the early 90s, these "account overlaps" are acknowledged in internal analyses of the present customer situation. (Described in Section II, chapter 2)

focus on industrial customers in the pharmaceutical industry, for both process and analytical laboratory products, is accentuated.

Changing relationships with existing customers

Concurrent with this process, the customer orientation process also encompasses successively changing relations with existing customers in the early 90s. Firstly, many laboratory customers require more intense and shifting contacts with the company as the use of the separation technology and the separation problems become more sophisticated and demands for higher speed and efficiency increase. Some of the laboratory customers also become increasingly involved in new types of research, e.g. molecular biology research in the 1980s. In some cases, Pharmacia Biotech AB starts to supply supplies also for these activities. Secondly, among the pharmaceutical industry customers, the company is able to supply supplies for several of the purification steps, sometimes requiring coordinated interaction with several internal departments; R&D laboratories, preparative, pilot plant departments, and process production departments.

Internal differentiation and polarization of customer relations

Internally, the changing customer relations lead to processes of differentiation and polarization of the contacts. Firstly, there emerges a group of customer relations with a higher degree of direct contacts between the customer and both the local and the central Pharmacia Biotech AB units. These are above all the industrial process departments which require more intense support. Customer relations with laboratories are only initially handled by support from the central production units; most contacts are decentralized to the local sales organizations. Secondly, in the 1990s, Pharmacia Biotech AB moves towards a polarization, a differentiation between key accounts and non key accounts. Among the key accounts which require frequent contacts are collected both industrial process customers and laboratory customers. A new, special division is established to support local telemarketing units with standardized contacts and limited technical support.

Two additional customer orientation processes emerging in the 1990s are deserving of attention. Firstly, the acknowledgement of considerable *account overlaps* between the three sub-divisions/product companies of Pharmacia Biotech AB results in internal discussions and attempts to coordinate the parallel relationships with departments in the same pharmaceutical company better. The process is driven by increased internal coordination in the customer organizations.⁷ Secondly, the global pharmaceutical company customers' moves towards coordinated global sourcing strategies is a matter of

⁷As stated in Pharmacia Biotech's Annual Review 1995: "...The continuum between the biotech analytical lab and the process development lab is not always an unbroken arrow: communication between these groups varies widely. This means that analytical media sales do not always signify the first step toward building a bioprocess media relationship."(p.30)

increasing concern. In the 1990s, discussions start within the Company concerning coordination of parallel contacts with different, geographically dispersed production departments, all part of the same global corporation.

Focusing only on Pharmacia Biotech AB's customer relations in its strategic positioning process 1959-1994, the early 1990s see a significant change in customer orientation (Figure I).

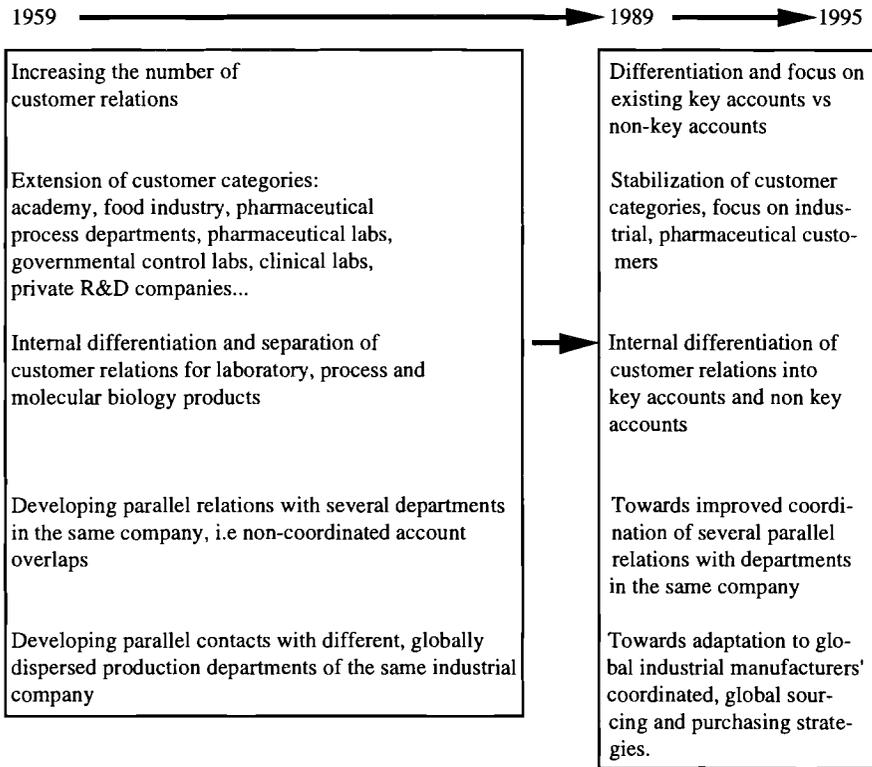


Figure I. Changes in customer orientation

The marketing changes started towards the end of the 1980s become strategic reorganizations and reorientations; Pharmacia Biotech AB partly introduces completely new modes of orienting the organization towards the customers.

THREE MAJOR PERIODS OF DEVELOPMENT

As this study of the company proceeded and the story about Pharmacia Biotech AB took shape a certain logic began to emerge. When exploring the history of the company there indeed began to emerge - with the marketing change episodes of 1989 and onwards, and

with the marketing and distribution organization in focus - "a drama of great events". The radical reorganization and reorientation in the early 90s was in many ways exceptional. However, when looking back, there proved to be a whole series of important events which each time had modified the marketing system structure, laying the foundation for coming changes. Change events can be associated with certain years or periods and coincide with organizational and/or technological changes.

In a historical, linear time perspective, the story of the emerging new biotech supplier can be divided into three major periods:

1. Forming the Foundations for a new Biotech Company (1941-) 1959-1982
2. External Expansion, Merger and Creation of a Multinational Corporation 1982-1989
3. Radical Reorganization and Reorientation 1989-1995

The title of each of the three periods signals where most of the company's efforts and attentions are directed during certain periods of time. The changes connected to the three phases not only affect the marketing and distribution operations but most aspects of the company's activities. The period up to 1982 is characterized by the efforts to establish a new business venture within the formal boundaries of the Pharmacia Corporation. During the next period, 1982-89, Pharmacia's and the biotech company's external expansion process with acquisitions, mergers and the formation of strategic alliances, reaches its peak, influencing every part of the company's operations. The last period, 1989-95, Pharmacia Biotech AB enters a period of radical reorientation and organizational change. Most activities and organizational units are affected by the many efforts to transform the company.

Depending on the dominating trends and characteristics, and on the type of change event that is introduced, each chapter generates its own logic and mode of description.⁸ The connecting thought that runs through the case is that different tensions and breaks with established marketing and distribution traditions appear during all periods, laying the foundations for subsequent changes.⁹ For example, three years of the second period (1986-1989) are devoted entirely to the problems of a company merger, compiling the

⁸There are by no means any clearcut boundaries between the dominating change forces and the three periods. For example, the biotech supply company's external orientation and expansion efforts reaches a peak between 1982 and 1989, but the internationalization process starts much earlier and the external expansion continues also during the subsequent period.

⁹In accordance with Pettigrew (1985) the aim is "to develop a process theory which links together the periods of high levels of change activity and low levels of change activity and thus begin to explain the timing and relative intensity of those periods". In line with this, the identification of "great events" becomes an important first step in the study process. (In: Pettigrew, A., *The Awakening Giant - Continuity and Change in ICI*, Oxford: Blackwell, 1985, p.446).

major effects on the established marketing traditions when Pharmacia merges its biotech supply operations with those of LKB Produkter AB (Chapter 3). The focal marketing reorganization period (1989-1993) is built around four central change episodes - partly overlapping with four formally defined change projects - each of which directs Pharmacia Biotech AB's marketing and distribution in new directions (Chapter 2). A complicating factor during this period is the fact that the four change episodes become connected, being part of the moving context of each other.

Here, the story does not appear in a chronological and consecutive time order, following instead the constructs "concurrency", "transition" and "evolution",¹⁰ and the argument that marketing changes appear in different temporal contexts. In certain parts, the story jumps back in time, in order to trace the origins of the marketing change processes in focus.¹¹ The story also contains jumps between actor levels, shifting descriptions of focal actors. While some descriptions make visible the involved individuals, other descriptions have the focal biotech groups, divisions and companies as starting point. The fallacy of describing organizational marketing changes as emerging in a world *sui generis* is partly avoided by bringing in groups of individuals, i.e. task forces or project groups, in the focal marketing change episodes. The marketing episodes are predominantly described from the point of view of central task force groups, all with the formal responsibility to change certain marketing activities: the physical distribution activities, the service support activities, or the organizational structure of the international marketing system.¹² To introduce and provide an overview of the company's development, in Table I are summed up important breaks, events, that have shaped the historical processes and the moving, organizational context.¹³

¹⁰Described in the analytical discussions of the study.

¹¹It is also a reflection of the author's emerging notion during the study process that the fixation with linear, chronological perceptions of time might severely hamper an increased understanding of marketing phenomena.

¹²From this follows that Pharmacia Biotech's strategic change process - including the company's attempts to change its relations with the customers will to a large extent be described from the point of view of actors with *very limited direct contacts* with the customers. That is, although the case rests on a network and relationship oriented perspective, many of the descriptive parts will focus on the first step in the distribution network, i.e. the relationships between the central, responsible task force units and the intermediary marketing subsidiaries which are responsible for implementing the new way of handling the local customers.

¹³The table and description follows the original, *linear* historical case study structure.

Chapter	Title	Year	Event(s)	Distribution change
5	Emergence and Product Group Formation 1959-67	1959	The launching of a new laboratory separation method and chemical product. Establishing contacts with completely new customer groups.	Introducing a completely new range of products in the established channels and flows for pharmaceuticals. Establishing separate sales and distribution activities in the new emerging sales subsidiaries.
5	Divisionalization and Organizational Expansion 1967-74	1967	Reorganization and increased organizational status and independence. New hardware products are added and a new factory is opened in Umeå. The launching of industry scale products to new industrial process scale customers.	Separation of chemical and instrument production. Reorganization of product flows from production. Introducing hardware/instruments in the flow of separation chemicals.
5	Subsidiary Company Formation and Technological Unification 1974-82	1974	Formation of three subsidiary companies in Pharmacia for Separation Products, Diagnostics and Pharmaceuticals. Introducing "the new biotechnology" as integrating factor for the companies. Launching of first integrated instrument system.	Organizational and operational adaptation of the separation product unit to those of two sister divisions: Pharmaceuticals and the new Diagnostics company. Introduction of instrument systems requires the introduction of services and reversed flows in the channel, i.e. instrument flows from customers back to local or central Pharmacia organizations.
5	External Expansion and Subdivisionalization 1982-86	1982	Acquisition and integration of US company P-L Biochemicals and radical step into new technological area: fine chemicals for molecular biology. Creation of three internal subdivisions for biotech business: laboratory products, process scale products and molecular biology products.	Integration of P-L Biochemical's fine chemicals in existing product flows for separation products.
3	Merger and Organizational Consolidation 1986-89	1986	Acquisition and complete merger of Pharmacia's Biotechnology Group with LKB-Produkter AB	Complete organizational merger of distribution flows, and of connected organizations and activities for R&D, production, administration, sales, marketing, etc.
2	Reorganization: Regionalization and Rationalization 1989-1993	1989	The Procordia-Providor-Pharmacia deal: integration of Pharmacia in the Procordia Group. Disintegration of Pharmacia companies for pharmaceuticals, diagnostics and biotech. Start of radical internal reorganization programs.	Radical reorganization of distribution flows(daily direct distribution). Connecting new distribution organization to new, reorganized international sales and marketing organization. Connecting improved distribution efficiency and effectiveness with new views of customer contacts and service output levels.
4	Pharmacia Biotech 1993-95: Signs of a New Emerging Stability - and the Organizational Changes Continue..	1993	Creation of a new self-contained biotech company within Procordia - Pharmacia Biotech (1992). Radical internal reorganization of the biotech organization: from three Product Companies to four integrated Product Divisions (1993).	First steps towards reorganization and stronger integration of production and distribution activities. Continued adaptation and differentiation of marketing activities to key account structure.

Table I. Summary of the original linear case study structure

The study explores Pharmacia Biotech AB's attempts to adapt and change its marketing and distribution over a period of 30 years, but with emphasis on the period 1989-1993. Broadly conceived, the study of the company explores two types of connected processes. Given the emphasis on time and historical processes, one part of the study describes the emergence and evolution of the organizational context of Pharmacia Biotech AB with focus on the marketing operations. In a second part, the agency perspective on change is emphasized in the descriptions of four longitudinal change episodes on different levels and in different parts of the organization. The strategic change episodes are put into their historical, organizational context.

The rapidly developing field referred to as biotechnology and the global network of organizations involved represents in a general sense the dynamic context for the Company's marketing changes. The technological complexity inherent in the processes is coupled with an equally sophisticated combination of industrial goods and services linked to the marketing activities, completing and adding to the complex picture of marketing reorientation in the company.

STRUCTURE OF CASE NARRATIVE

With our three temporal perspectives as our starting point (and with the general theoretical discussions of Part I in the separate, analytical discussions as background and foundation) we here move into the Pharmacia Biotech AB case narrative.¹⁴

To set the scene, the case narrative starts in chapter 1 with an overview of some of the major movements in Pharmacia Biotech AB's industrial ("outer") context.¹⁵ It describes some major movements in the interconnected pharmaceutical, health care and biotech industries, focusing mainly on the period before and during Pharmacia Biotech AB's radical marketing reorganization.

In chapter 2, we enter the focal marketing change episodes 1989-93, which relate to the problems of "concurrence", describing four interacting change episodes. Three of these (The Distribution and Logistics Episode, The After Sales Service Episode, and the Regionalization Episode) are aimed at the core of the company's marketing organization,

¹⁴The description thus follows the three temporal perspectives connected to the three concepts "concurrence", "transition" and "evolution", presented in chapter 3 of the analytical text.

¹⁵In accordance with e.g. Pettigrew's (1985) suggestion that a contextual analysis and understanding of strategic change processes can be enhanced if based on an initial understanding of the context, in this case, the "outer", industrial context. (In: Pettigrew, A., *The Awakening Giant - Continuity and Change in ICI*, Oxford: Blackwell, 1985, p.446)

while the fourth (The Biosystems Episode) describes an organizational change episode affecting the company and its relations to other companies in the Pharmacia Group.

Chapter 3 and chapter 4 aim to add to our understanding of "transition", that is, of the four change episodes' intermediate position between episodes of the immediate past 1986-89 (part of a long-term merger process between the Pharmacia Biotech Group (BTG) and LKB Produkter AB) and continuing marketing change episodes of the period 1993-1995.

Chapter 5 takes several steps back in time, describing the "evolution" of Pharmacia Biotech AB and its marketing system from 1959 (with a prologue starting around 1941) until 1986 and the start of the BTG-LKB merger. The chapter adds a piece to the picture of Pharmacia Biotech AB's historical process, in which the marketing change episodes are embedded. In chapter 6 are described some of the major long-term movements of parts of Pharmacia Biotech AB's immediate and most important context: that of the Pharmacia Group. Within this organizational context ("inner" and/or "outer" context depending on the perspective chosen) Pharmacia Biotech AB emerges as a self-contained biotech supplier. The company's marketing organization emerges within the context of a pharmaceutical organization, successively decoupling its own organization from other (pharmaceutical and diagnostic) product channels. Figure II sums up the perspectives in the case narrative.

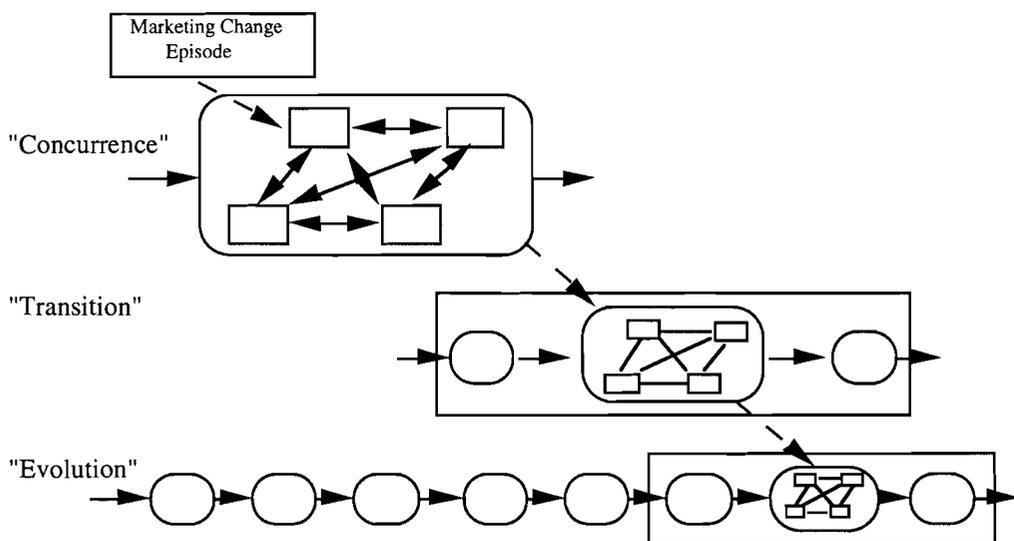


Figure II. Focus and steps in the case narrative: concurrence (chapter 2; four concurrent change episodes 1989-1993), transition (chapter 3; a merger process 1986-1989 + marketing changes 1993-1995), evolution (chapter 5; marketing organization changes (1941) 1959-1986)

Descriptions and discussions in the case narrative move from the micro dynamics of marketing episodes to the broader, organizational network context, trying to connect each preceding chapter to the next when extending systemic and temporal perspectives. The marketing change episodes are put into the immediate and the more distant context.

1 The Moving Industrial Context

The cyclical rise, emergence and transformation of Pharmacia Biotech AB's emerging industrial marketing system becomes embedded in and part of long-term movements in the industrial context, positioning the company and its marketing and distribution operations in new organizational and technological contexts. For Pharmacia Biotech AB, these sometimes barely visible movements, when the company is connected to new technologies, new production systems and new counterparts, cover decades.

The fact that Pharmacia Biotech AB in 1990 is a fairly young biotech supplier, involved in what is considered a fairly young technology (which of course can be debated) does not make it easy to acknowledge the long-term movements in the technological, organizational and institutional context which the company becomes part of. The complexity, uncertainty and ambiguity that become the apparent characteristics of Pharmacia Biotech's emergence and radical change come to be strongly connected to the same characteristics of the global, emerging "new biotechnology".

TECHNOLOGICAL AND NETWORK CHANGES IN THE PHARMACEUTICAL-BIOTECH INDUSTRY NETWORK

Simplifying and condensing the picture of some of the main, powerful movements in the global biotechnology health care complex, it is possible to vaguely discern how they come to mirror changes in Pharmacia Biotech AB's marketing activities and interactions. (Table 1.1.)

Table 1.1. Movements in the industrial biotechnology context

Technological Changes	Industry Network Changes	Effects on BTG Channel Activities & Interactions
<i>Diffusion:</i> the emergence of scientific discoveries in DNA research (1940-50s) and the start of diffusion of bio-technological applications (1970-80s): pharmaceutical&health care, agriculture, chemical, food, energy, environmental and process industry production.	From an R&D, university based network of organizations to a global network of universities, R&D companies, biotech equipment suppliers and a wide variety of users applying biotechnology in basic& applied research and production.	A successively more diverse set of user production activities are connected to the distribution channel. From the start with academic users, a more diverse set of internal contacts with users of the biotech supplies emerge (universities, pharmaceutical industry, food industry, governmental institutions, health care organizations), requiring adaptations of internal interactions.
<i>Maturing:</i> The new biotechnology and the basic DNA research achievements are transformed into applied research and industrial applications, with the pharmaceutical/health care industry leading the way in the 1970s and 80s.	The R&D based, University-Industry relationships remain, but are complemented with a diverse set of new, industrial supplier-buyer relationships. New biotech suppliers emerge and established industrial users enter the global biotech network. Many actors develop a diverse and diffuse set of roles in the network.	The channel is connected to a more diverse set of user activities: basic R&D, applied R&D and industrial production. The relationships with buyers involve one, two or all three activities. Contacts with industrial customers can involve interactions with a number of different buyer departments and units (R&D, production).
<i>Interdisciplinarity:</i> A number of different R&D and basic science areas are connected to form the basis of scientific advances. The already interdisciplinary, pharmaceutical industry (chemistry, engineering, information technology etc.) is first connected to the likewise emerging interdisciplinary biotechnology (engineering, information technology etc). Traditional chemical pharmaceutical activities are linked with biotechnology.	Overlapping industrial networks emerge with the biotech - pharmaceutical - health care organizations as an important core in the global network. The result is a diffuse competitive situation.	The content of channel flows and the activity structure successively become more complex, encompassing instruments, computer hard- and software, chemicals, knowledge, and technical and application services. Consequently, the content of interactions backwards to suppliers and forwards to customers become more multifaceted.
<i>Specialization:</i> From a comparatively homogeneous base in DNA research in the 1960s and 70s, the 1980s and 90s see the emergence of a more diversified (and diffuse) "biotechnology"; specialized application areas and niches emerge, e.g molecular diagnostics in the pharmaceutical-health care sector.	Actors start to develop more specialized positions in the biotechnology network. In some parts of the network, an increasing specialization and more apparent division of work develops.	The company's activities and interactions are directed towards technologically and financially important key customers, mainly in the pharmaceutical industry, while keeping the contacts with the large accumulated set of buyers, e.g. in the academic sector.

<p><i>Globalization:</i> The connections between R&D centres globally already from the start of the emergence of the new biotechnology is complemented with intra-(USA, Europe, Japan) and interregional connections between industrial, biotechnology based user activities, partly driven by the globalization of the pharmaceutical industry activities.</p>	<p>A global biotech-pharmaceutical-health care industrial network emerges, with important R&D clusters in USA, Europe and Japan. New supplier-buyer relationships emerge in an already from the start highly international network. Large industrial users, e.g in the pharmaceutical industry move towards global sourcing of biotech supplies.</p>	<p>The channel activities and interactions of the separation product units emerge in a highly international R&D network. A rapid international expansion is followed by intra-regional coordination to adapt to increasingly internationalized buyers, followed by emerging attempts to improve inter-regional coordination and adapt to industrial customers' increasing global sourcing activities.</p>
<p><i>Costs:</i> Rising R&D biotechnology costs. Rising costs to develop biotech based drugs and diagnostic tests for pharmaceutical biotech users. Rising costs for taking new drugs from R&D to clinical testing, production and market introduction.</p>	<p>Rapid increase in the number of acquisitions, mergers and strategic alliances in the global biotechnology-pharmaceutical-health care complex during the 1980s. Complementing the technology based reasons for cooperation, cost reasons (R&D, production and marketing) become more important.</p>	<p>Channel activities and interactions of companies are merged. Successively, and escalating during the 1980s, the number of acquisitions and mergers increases, increasing the size of the intra-corporate network engaged in biotech activities. It is followed by needs for internal reorganizations and improved internal coordination of a growing set of activities and interactions.</p>

Table 1.1. Movements in the industrial biotechnology context

To go from the short time span of a strategic marketing change episode, to the longer time span of the moving internal, organizational context and then on to the long view and the industrial and technological movements covering decades, and then back again to reconstruct the focal change episode with our new insights, is not an easy task. However, having rejected the idea of the isolated, short term, strategic marketing event - or episode - as the level of analysis, it is difficult to escape from the fact that both the long-term and the medium term contextual movements matter.¹ Bringing in longer time spans as inherent characteristics opens up for new intriguing but interesting problems. How do these movements interact?² The slow running movements of Pharmacia Biotech's industrial context condensed in Table 1.0 formed an important multidimensional and multidirectional context for the emergence of the new marketing channel and the structural marketing change events of the late 80s and early 90s.

¹Braudel (1958) acknowledges the problem when putting social phenomena and events in their long-term, historical context, moving between time perspectives: "...and having got there, to think about everything afresh and to reconstruct everything around one: a historian could hardly not be tempted by such a prospect...(but) In fact, these different time spans which we can discern are all interdependent: it is not so much time which is the creation of our minds, as the way in which we break it up."(In: Braudel, F., *Annales E.S.C.*, no. 4, October-December, 1958, p.48)

²Braudel (1958) describes it from the point of view of social events, a "structural social crisis", which can be compared to our focal marketing structure changes: "A structural social crisis should be equally possible to locate in time, and through it. We should be able to place it exactly, both in itself and even more in relation to the movement of associated structures. What is profoundly interesting to the historian is the way these movements cross one another, and how they interact, and how they break up...(Ibid, p.49)

Pharmacia Biotech AB's marketing change episodes do not emerge embedded in the historical processes of one singular, easily defined, industrial context. Hence, the Pharmacia-Procordia-Provendor deal and the following reorganizations from 1990 and onwards are partly "natural" consequences of the fact that Pharmacia as a whole is entering a new phase in the long-term transformation of the local Swedish and of the global pharmaceutical-health care industry. Concurrently, BTG's marketing change episodes become part of the general, technological and organizational movements of the diffuse "biotechnology sector", part of which is the biotech equipment and supply sector. Lastly, complicating the picture is the fact that the biotechnology and pharmaceutical health care sectors are interconnected, following the diffusion and application of biotechnology among pharmaceutical companies.

THE STATE OF BIOTECHNOLOGY AROUND 1989

During the late 1980s, when Pharmacia LKB Biotechnology, leaving a turbulent period of merger and organizational consolidation and entering a period of new, radical organizational changes, rapid advances and progress in many different directions - with multiple interactions and spin-offs between different industrial sectors - continues to characterize the global, new biotechnology.

Definitional problems remain since the 70s, the decade when an efficient set of techniques called Modern Biotechnology are developed; in the 80s biotechnology, and particularly the new biotechnology, emerges not as a distinct sector, but as a broad enabling technology affecting many sectors of the global economy. As a consequence, when terms like the *biotechnology industry* and *biotechnology companies* are used in the end of the 80s they refer to a broad and diverse set of long established, and new, emerging organizations carrying out industrial R&D in modern biotechnology and applying the scientific and engineering principles of biotechnology to produce materials.

The scale of applications and the pervasiveness of the new biotechnology clearly increase during the latter part of the 80s. It finds applications in primary industries (agriculture, forestry, mining), in secondary industries (chemicals, pharmaceuticals, food) and in tertiary industries (health care, education, research, advisory services). The complex and multifaceted situations that Pharmacia Biotech AB and other biotechnology related companies find themselves in at the end of the 80s become inseparably connected to the general complexity of the technological and organizational contexts of biotechnology; i.e its pervasiveness and growing rate of diffusion in industrial use, to the fact that research

in both established and in new key areas advances at a rapid pace, by the high degree of unpredictability of numerous technological developments, its continued interdisciplinary character, and by the fact that the roles of participating companies continuously change and lead to sometimes diffuse competitive situations.

The state of biotechnology around 1989 as regards the interdisciplinary character remains stable: it is still a synthesis of a number of interrelated disciplines like biochemistry, microbiology, medicine and engineering sciences. The stable base is still a number of interrelated biosciences, while biotechnology comes to denote their commercial applications both on a laboratory and on an industrial scale. The wide and general definition of biotechnology given by OECD in 1982 i.e "the application of scientific and engineering principles to the processing of materials by biological agents to provide goods and services.", is still applicable, but reveals little of the underlying, ongoing technological changes at the time.³

The long-term technological movements in biotechnology show clear signs of multi-directionality. Important technological progress is still made in several basic research areas, scientific progress is rapidly transformed into applied research and into industrial applications, biotechnological applications are diffused into several different application areas. Within established application areas, the pharmaceutical industry for example, the widespread use is further strengthened and diversified. During the latter half of the 80s, the development of biotechnology enters a new phase, outstripping the dominance of scientific R&D activities:⁴

The early years of industrial R&D in biotechnology have been dominated by a strong "science-push". Product development often focused on scientific and technological feasibility rather than on real market needs, and not enough attention was paid to costs. During the last two or three years, companies have become more concerned with technical limits, costs and market demand.

Companies involved in the new biotechnology enter a new, ambiguous situation. R&D, encompassing high R&D expenditures, and scientific progress continues to play an important role, while simultaneously, the transformation into industrialized applications becomes increasingly noticeable and requiring companies to adopt "industrial", cost and marketing oriented, strategies. The early years of strong science-push and the strong foothold in basic research is successively changing.

During the first half of the 80s, the world experiences the first stage of the biotechnology boom, primarily involving investments in equipment and know-how to permit the development of economically viable processes. This provides a substantial boost to

³*Biotechnology: International Trends and Perspectives*, OECD Report, 1982, p. 21

⁴*Biotechnology: Economic and Wider Impact*, OECD Report, 1989, p. 10

research in the fields of biochemistry and cell biology in universities as well as in industry. R&D investments are paired with investments in industrial process technology and a general scaling up of the processes earlier performed in laboratories. Predictions for the 90s and the first decades of the 21st century indicate that a second boom will stimulate further interest in biotechnology and broaden its area of application. This will lead to renewed investment in research and process development. From 1985-86, the steady, high level of public and private spending in biotechnology levels out. Suppliers to the biotech oriented companies, e.g Pharmacia Biotech, experience reduced demand for biotech equipment applied in research as well as in industrial production. In the beginning of the 90s, figures from the US biotech industry indicate a renewed interest in R&D spending.

The renewed interest in R&D spending is reported to be coupled to a significant change; in Europe figures indicate a concentration of public and private spending on scientific R&D. A more limited set of R&D projects, companies, and academic research institutions receive R&D funding, "the rich are getting richer".⁵ Simultaneously, the technological and funding changes create a more complex competitive situation for involved actors; a competition between companies, technologies, projects and funding priorities.

In 1989, biotechnology has not yet reached the stage where it can reduce the costs of a wide array of products and services. However, already there are areas where cost reductions are possible to achieve, e.g in the pharmaceutical-health care sector.⁶

During the 80s, the development of the biotechnology sector remains strongly influenced by scientific achievements in basic research in a number of disciplines; biochemistry, genetics, microbiology, molecular biology, and others. Although significant resource investments in the sciences underpinning biotechnology obviously have led to a large number of advances, the same advances have also indicated new technical bottlenecks. New scientific discoveries give indications of a significant range of novel applications. Rapid advances open up new, fundamental research gaps.

The main scientific bottlenecks identified are in many cases related to problems of developing techniques and methods for turning scientific discoveries into industrial

⁵Pharmacia Biotech, Strategy Meeting 920117

⁶During the second half of the 80s, biotechnology is already having significant economic effects in the pharmaceutical industry, medical care and agriculture. The economic effects in other industries such as the chemical industry, oil recovery, the energy industry, the food industry and in a range of other industries are still highly dependent on the progress of research, development and design. Although applications are spreading to a wide range of industries, the actual range of applications are still far narrower than the potential. Biotechnology is entering a phase where it begins to become established in certain industries, while in other areas the reliance on intense R&D is still necessary in order to reach a widespread commercial application.

applications. An important bottleneck in the beginning of the 1980s has been identified within the area of engineering. Costs of engineering research are higher, advances are slower and major breakthroughs are infrequent. Most of the engineering problems identified concern up-scaling. That is, it is reported that the different steps in the biotechnical production process need to be taken from a laboratory pilot-scale to an economical large-scale production. In 1989, OECD reports state that there is a definite upswing in biochemical engineering. The increased needs for improved speed, supervision and automation mean that information technology (computer science, instrumentation etc.) has started to influence more openly the development of biotechnology. A new appreciation and upswing for chemists and biochemical engineers acquainted with large scale production is also reported. In the beginning of the 90s, companies engaged in the new biotechnology find themselves in a new situation; the early dominance of and importance attached to basic research has been complemented with a radically increased interest in "down-stream" aspects of R&D and production. However, the process is cumulative. In the situation of a general levelling of R&D investments after 1985, efforts are to some degree redirected to applied research and industrial production. Investments in basic R&D return to a higher level in the beginning of the 90s. Companies not only attach increasing importance to the scaling up process for following up scientific successes; technological (and organizational) changes concern more openly the problem of linking efficiently and effectively "up-streams" basic research with applied R&D and industrial production.⁷

Molecular biology, in a wide sense, is becoming the underlying driving force in many biotech application areas. Within this area, however, a significant change is emerging in the beginning of the 90s. Several of the disciplines underlying basic biotech research - analytical biochemistry, DNA technology, genetics, cell biology, clinical research - rapidly transform basic biotechnology. In short, biotech research changes emphasis, moving towards the area of diagnosis and prevention. Biotechnological methods of diagnosis and prevention are expected to impact strongly routine applications in several areas in the 90s: clinical, veterinary, horticulture, food, agriculture, environment.... Research emphasis in the pharmaceutical related sectors is transferred to applied research and molecular diagnostics. The change towards diagnostic tests and effective preventive methods rather than costly therapeutic treatment becomes the dominating underlying driving force of biotechnology.

The change towards molecular diagnostics introduces "the genetic age" to the next step: diagnostics and analysis. This change is not, however, unique for the biotechnology

⁷*Financial Times Survey*, March 1993

supply industry. During the 80s, parallel long-term changes can be found in many related industries. In the pharmaceutical and health care sectors the move towards diagnostics means that technological development efforts successively are being directed towards the development of rapid and highly specific molecular biology based tests. The possibilities of future mass diagnostics cause analysts to start talking about "the diagnostics revolution", with vast effects on the global health care sector.⁸ It is already acknowledged in 1989 that the impact of the diagnostics revolution will be wide. Beside the diagnostics of man and animals and the monitoring of the effectiveness of drugs, a number of other application areas are acknowledged: quality control of food, air, water and soil through detection of pollution agents, criminal investigation, industrial purification of biological products and online control of biological processes. Equipment suppliers to basic and applied research, including diagnostics, e.g Pharmacia Biotech AB, acknowledge the long-term shift towards molecular diagnostics, but also see that in the near future much narrower definitions of specific diagnostics application areas will be necessary to define, be they "molecular ecology", "molecular pathology" or "molecular physiology".⁹ For suppliers related to the development of diagnostic and preventive tests for the health care sector, it is also acknowledged that the technological context in which these tests will be used is changing. Innovations are expected e.g in sampling automation, the development of expert systems for processing tests and analyzing data, integration with and change of telecommunications for the transmission of data from laboratories to data processing centers, and improved and adapted computer software for analyzing tests.¹⁰

In the beginning of the 80s, predictions are more difficult to make about the the future industrial applications.¹¹ Apart from the pharmaceutical industry, predictions indicate that impacts during the 80s and beginning of the 90s will be most observable in the chemical industry, food and agriculture and in the energy and environmental sectors. Thus, different reports at the end of the decade normally list the following dominant application areas:

- Health care including pharmaceuticals
- Agriculture and agro-industry
- Food and feed industry
- Environment and energy sectors
- Chemicals and other process industries

⁸OECD Report (1989): "The diagnostics revolution will cover a broad spectrum, including prenatal diagnosis, early diagnosis of the onset of diseases, and the monitoring of degenerative diseases. The new tests have many interesting characteristics: rapidity, specificity, facility of use, a wide spectrum of applications and great sensitivity to small quantities of test material (blood, urine, cells etc.). They are appropriate for periodic check-ups of individuals, and their use extends to the *general population*." (*Biotechnology: Economic and Wider Impact*, OECD Report, 1989, p. 68)

⁹Pharmacia Biotech, Strategy Meeting 920117

¹⁰OECD Report, 1989, p. 68

¹¹OECD Report, 1982, p. 23

In addition, reports often include the sector manufacturing and selling

-Biotechnology equipment.

The division of application areas in reports during the 80s and beginning of the 90s indicates that the difficulties to define a biotechnology industry remain. Furthermore, to provide a distribution of activity by sector proves difficult because many companies have been, and remain, active in several sectors. As regards the biotechnology equipment manufacturers, like Pharmacia Biotech, many of them supply instruments and additional equipment to companies, public organizations and academic institutions in several of the five application areas. Some of the equipment manufacturers have already become strongly associated to one or several application areas (e.g. Pharmacia in pharmaceuticals), while others have developed a biotechnology engineering competence from a long-term experience in other sectors of instrument production.

According to predictions, instrument technology will also be adapted to a wide spectrum of applications and application industries.

During the 70s and 80s, the diffusion of biotechnological applications spreads unevenly through different industries. The pharmaceutical industry is first to adopt it and to up-scale manufacturing processes. There are early spin-offs both to the food sector and to the agro-industrial area (animal feedstuffs, veterinary medicines etc.). Also the environment sector and public service sector (e.g. oil recovery, water purification), the energy sector and certain sectors within the chemical industry are soon following the footsteps of the pharmaceutical industry. In the late 80s, the potential for biotechnology within other process industries like mining, paper and pulp industries and other chemical industry areas are acknowledged. However, the difficulties to shift process technologies are acknowledged to be large, so the development is generally expected to be slower in these areas. Descriptions and reports implicitly convey the general diffusion pattern of Figure 1.1.

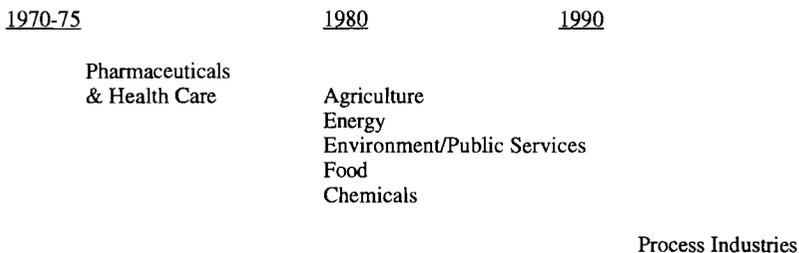


Figure 1.1. The diffusion of biotechnology in different application areas

Equipment manufactures supplying instruments, fine chemicals, application services and other products are becoming central actors in the process of extending and diffusing the new technology. The continued importance of basic research parallel to the diffusion of applications means that biotech supplies are being employed by companies and organizations in many different, established sectors.

A CHANGING INDUSTRIAL NETWORK

The emergence of a new industrial network parallels the diffusion of modern biotechnology. The new interorganizational network structure emerges from the joining of business and research activities of both new and long established industrial companies and research institutions. The significant growth of a large number of new companies during the late 70s and early 80s is to a large extent due to spin-offs from established research institutions, commercial biotech companies and pharmaceutical companies. The difficulties to define and delimit biotechnology and to define clearcut distributions of biotechnology sectors equal the difficulties to delimit the emerging, global network of organizations involved. Competitive and cooperation interests intermingle and companies' engagement in different sectors of biotechnology overlap. Companies engage in scientific research, apply the technology or do both, and alliances between actors become global but change over time and range from specific research ventures to very complex cooperation agreements. Companies involved in the new technology remain highly heterogeneous: multinational pharmaceutical and chemical corporations, universities, new venture capital companies, small university spin-off companies, and various companies applying the technology all come to be part of the growing global biotechnology network.¹² One of these companies, Pharmacia Biotech AB, develops positions as supplier of biotechnical research equipment, supplier of input goods and as engineering company supplying large-scale process equipment and input goods.

The growing number of actors engaged in biotechnology during the 70s and 80s results from the emergence of a large number of new companies engaged in applied research - often linking basic university research with industrial process applications - and to the growing number of established companies adopting biotechnological processes and methods in their production. Government regulating agencies and cooperative interest

¹²Laage-Hellman, J. and Axelsson, B. (*A study of the biotechnology R&D network 1970-1985*, STU-information 536-1986, Stockholm 1986) present a generic biotechnology network based on a longitudinal study of the Swedish R&D actors. It includes: universities, research institutes, R&D firms, research equipment suppliers, suppliers of raw materials, companies applying biotechnological production processes, consultants and engineering companies, and users of biotechnology based, manufactured products. (In: Laage-Hellman and Axelsson, *A study of the biotechnology R&D network 1970-1985*, STU-information 536-1986, Stockholm 1986, p. 7)

organizations come to play important roles in the development. Changes in the biotech network appear over time both in the structure of the research sector, in the structures of the various application industries and in the integration between the two. The organizational changes in most application areas are not as significant as those which emerge in the pharmaceutical industry and health care sector.

By the mid 80s, over 500 independent specialized biotech companies have been established worldwide, many of them founded as venture capital companies with molecular biologists from universities as founders.¹³ Parallel to the emergence of these freestanding companies, leading companies in the pharmaceutical, chemical, agricultural and energy industries establish their own biotech groups, divisions and programmes, some of them resulting in new companies being formed. In addition to the changes in the number and characteristics of biotech companies - including a large number of mergers - the period 1970-1993 becomes above all characterized by the emergence of a web of alliances and cooperation patterns between companies.

Longitudinal studies of the global biotechnology network confirm the two most significant changes; the increasing number of companies and the increasing number of strategic alliances between companies.¹⁴ The number of new biotech related companies (research companies, biotech suppliers and application companies) increases considerably between 1970-1990. The increase is highest in 1980-81 and remains on a high level until 1986-87 when the number of new companies drops considerably. The majority of companies are involved in more than one of six biotechnology sectors coded by OECD (agriculture, diagnostics, therapeutics, general biotech, food and veterinary); around fifty per cent become involved in two and three different sectors. By the beginning of the 1980s, one of the most significant organizational characteristics surrounding the new biotechnology is the formation of an elaborate web of cooperation ventures. The emergence of a tight network of relationships between biotech venture capital companies, universities, biotech suppliers, research labs, multinational corporations and other companies is explained by the uncertainties surrounding the new technology.¹⁵ Above all, the central positions of university institutions and research organizations come to separate the emerging biotech network from many other industrial networks. The new

¹³Barley, S., Freeman, J. and Hybels, R., "Strategic Alliances in Commercial Biotechnology", in: *Networks and Organizations: Structures, Form and Action*, Nohria, N. and Eccles, R.G.(eds.), Boston: Harvard Business School Press, 1992

¹⁴E.g. Håkansson, P. and Kjellberg, H., *Strategiska Allianser mellan Bioteknologiska Företag*, student essay, Stockholm School of Economics, 1992 (building on the BioScan data base, Onyx Press), and Håkansson, P., Kjellberg, H. and Lundgren, A., *Strategic Alliances in Global Biotechnology - A Network Approach*, Stockholm: EFI Research Paper 6469, June 1992

¹⁵Barley, S., Freeman, J. and Hybels, R., "Strategic Alliances in Commercial Biotechnology", in: *Networks and Organizations: Structures, Form and Action*, Nohria, N. and Eccles, R.G.(eds.), Boston: Harvard Business School Press, 1992, p. 317

biotechnology had been born in the laboratories of universities performing basic research. The emerging network of relationships between universities, multinational corporations, new dedicated biotech companies and government institutions remains strongly affected by the impact and importance of applied and basic research. The strong incentives for forming R&D alliances - for cost and risk reasons - remain stable during the 80s, and is even accentuated in the beginning of the 90s, according to industry reports.

A certain degree of dynamism is observed in reports on the emerging alliance structure. Alliance formation characteristics over time do not remain static. On the whole, during the 70s and 80s companies predominantly initiate alliances with companies within the same biotechnology sector.¹⁶ In the 90s, in descriptions of the pharmaceutical industry, it is reported that there are "new incentives to form research alliances" and such alliances invariably relate to connections with biotech companies.¹⁷ Pharmaceutical companies develop alliances with several biotech companies in order to broaden project and product portfolios, biotech companies invest in in-house chemical science resources or form alliances in order to broaden the research base and compete with pharmaceutical companies, and pharmaceutical companies are reported to integrate forward into the health care sector.¹⁸

The network formation process right from the start transcends national boundaries and continents, connecting companies in all the three significant regions: Europe, North-America and Japan. The American sub-network develops a dominant position in the overall global biotech network, attracting European and Japanese multinational corporations to become deeply involved in alliances with companies in the American network. In the 90s, the issue of global coordination of alliances and research projects becomes crucial. By the 90s, most significant pharmaceutical-biotech groups have R&D groups in America, Europe and Japan, presenting "considerable logistical difficulties".¹⁹ Suppliers to the pharmaceutical-biotech industrial complex are increasingly becoming aware of the necessity to adapt to customer demands for global sourcing.

Another big and important change comes in the 90s and affects the ongoing globalization process. A big change in attitudes concerning the use of contract research organizations (CROs) by both biotech and pharmaceutical companies is reported. Large pharmaceutical corporations increasingly enter new national markets by contracting local R&D companies

¹⁶Håkansson, P., Kjellberg, H. and Lundgren, A., *Strategic Alliances in Global Biotechnology - A Network Approach*, Stockholm: EFI Research Paper 6469, June 1992

¹⁷*Financial Times Survey*, March 1994

¹⁸*Ibid*

¹⁹*Financial Times Survey*, April 1993, p. 22

for performing certain parts of R&D projects, clinical testing for example. By contracting local CROs, pharmaceutical and biotech companies expand faster into new markets where regulatory and legislative rules require a high degree of local knowledge and contacts.

EMERGING TECHNOLOGICAL CHANGES IN THE BIOTECH SUPPLY SECTOR

The attention directed at biotechnology in the late 70s and early 80s is mainly focused on the biological aspects of research breakthroughs. It is noted in reports that despite its vital contribution to biotechnology, engineering has received less attention than the biological sciences. Engineering advances have in general been slower and major breakthroughs have been less frequent. The innovation processes and the costs of innovations are different. Perceived as one of the important bottlenecks for translating the biological innovations into working processes in the early 80s, it is assumed that future advances in engineering will have important repercussions on biological processing.²⁰ Advances and bottlenecks in engineering and instrumentation appear over time in all process steps of the general biotechnological production system (Figure 1.2).²¹

In the "down-stream" separation and purification steps of the processes for which companies like Pharmacia Biotech supply instruments and fine chemicals, two general engineering problems come in focus in the 1980s. These are improving both efficiency and effectiveness of existing laboratory scale separation instruments and techniques, and up-scaling of instruments for large-scale processing. Significant improvements in chromatography techniques are made and in the beginning of the 90s there is already an oversupply of standard instruments for chromatography instrumentation.

Another important development area becomes the integration of successive steps in the production process. The down-stream purification steps are crucial and become central in achieving a purer product, for example in the scaling-up for biotechnological, pharmaceutical manufacture. During the 80s, downstream instrumentation development enters a phase of automation. The integration of computer technology for efficient monitoring and analysis becomes one of the focal development areas. Computers are increasingly being used to integrate entire production processes.

²⁰OECD Report, 1982, p. 35

²¹Laage-Hellman and Axelsson, *A study of the biotechnology R&D network 1970-1985*, STU-information 536-1986, Stockholm 1986, p. 117

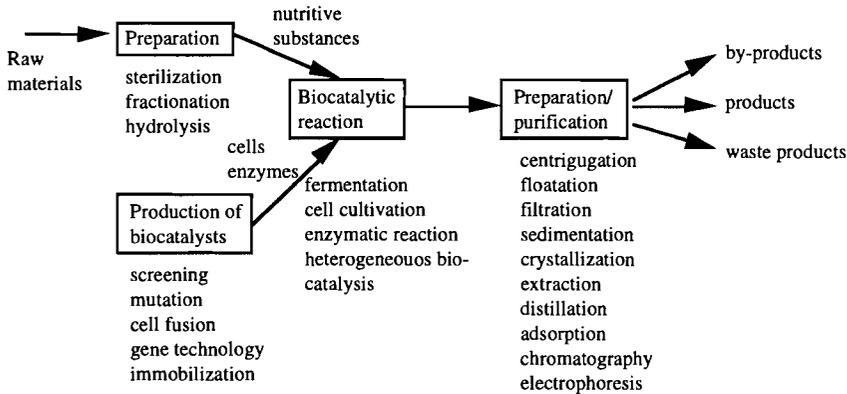


Figure 1.2. The biotechnological production process (Source: "Bioteknisk FoU i Sverige", STU/IM-Group 1986, transl.)

Other advances in the laboratory instrumentation area result in the first generation of so-called "gene machines" being launched in the beginning of the 80s. These are the first instruments to be able to synthesize specified short sequences of single strand DNA automatically under the control of a microprocessor. One of the single most important scientific breakthroughs in biotechnology in the middle of the 80s - the innovation of the PCR technique (polymerase chain reaction) for multiplying DNA - is expected to have strong impact on future instrumentation. Until the beginning of the 90s, the patent rights belong to the inventor, a group of American innovators of the company Cetus.

Another significant change noted in the biotech equipment area in the beginning of the 90s concerns the shift in emphasis from instrumentation supply towards a functional orientation, integrating instrumentation development and supply with a number of technical support and value-added services, including the supply of various consumables.

Already in 1982, reports on the current trends in biotechnology include the prediction that the number of instrument and input goods suppliers to the biotechnology sector - i.e. to basic and applied research activities and to industrial processing in pharmaceutical, chemical, dedicated biotech, food and feed companies, in universities, and in other research institutions - would grow. With their central positions in the new biotechnology network some biotech suppliers are able to provide instrumentation, fine chemicals and services to support biotech oriented companies in a number of different industrial sectors.

Like the emerging group of new dedicated, R&D based, biotech companies, the history of the suppliers is equally diversified. Some, like Pharmacia Biotech, emerge from the internal activities of a multinational corporation. Some minor companies start as spin-offs from academic research, and some start business founded on venture capital.

The generally increasing degree of international contacts between the world's biotech related companies in the 80's, positions biotech suppliers in an increasingly international context. (Competing and complementary instrument and separation media suppliers - sometimes linked to Pharmacia Biotech's biotech activities through links with the same customers - also come to represent a plethora of mixed national origins: European, American and Japanese.)

The complexity of the new emerging biotechnology with its multitude of research areas and applications of biotech instruments creates an ambiguous and diffuse competitive situation for instrument and fine chemical manufacturers in the 80s. Due to the diverse nature of the new biotechnology, manufacturers of biotech instruments and systems develop relationships with partly overlapping and partly different types of users - whether industrial companies, R&D companies or academic organizations - and from a product point of view, few manufacturers become positioned in identical areas. For established competitors in the separation and purification product business, for example the two Swedish manufacturers Pharmacia Biotech and LKB Produkter, the 1980-85 period increases competition from new, minor engineering companies and from a diverse set of larger corporations. The competitive complexity remains after the decline period 1986-1992 and in the beginning of 1992 Pharmacia Biotech describes the global biotech supply business for only one of the product areas, laboratory scale supplies in terms of:²²

... an increasingly more complex competitive situation. Competition between companies, technologies, projects and funding priorities. Large number of strongly competing companies - small and large, broad-based and niche focus. Most major competitors are US or Japanese based...Over-supply of (standard) technology is leading to price and technology dumping and a market shake-out.

In only one of the regions, USA, approximately 200 companies of different size supply biotech supplies in 1992 (100 of them public companies). The large number of small, often very local companies, explains the high degree of domestic sale, 73 per cent. Among the American suppliers, the number of profitable companies drops from 56 percent in 1989-90 to 33 per cent in 1990-91.²³ The same signs of risks for radical shake-outs among European and Japanese companies can be observed. During the latter half of the 80s, accentuated in 1989, the levelling of sales growth in the traditional separation product areas - electrophoresis and chromatography - causes the first signs of a shake-out of instrument suppliers.

²²Marketing planning meeting 920124

²³Ibid

In contrast to the other major biotech related business industries, e.g the pharmaceutical industry, there are fewer cooperation, strategic alliances among biotech equipment suppliers. Acquisitions and mergers become the more common factors driving structural changes. Pharmacia's acquisitions take off in the 80s with the acquisitions of the American fine chemical supplier P-L Biochemicals Inc. in 1982 and the Swedish instrument and separation media manufacturer LKB in 1986, and with similar mergers involving Pharmacia's competing instrument manufacturers. The large American, multinational competitor Millipore merges with another American manufacturer - Waters Associates - in 1980. The US based, multinational corporation Beckman Instruments merges in a similar way with another American manufacturer - SmithKline - in 1982. Along with the large, and to an increasing extent, multinational, corporations that manufacture and supply instruments, the 80s see the growth of a large number of very small instrument specialists.

Several factors contribute to create a dynamic, changing competition. Basic and applied research areas change directions, increasing the importance of instruments and chemicals for the growing molecular biology area. Manufacturers of standard instruments for downstream separation and purification based on chromatography and electrophoresis, experience a successively increasing competition. The reduction in research grants from public and private institutions for biotechnical research is a contributory factor in this. Users of separation products on both a laboratory and on an industrial scale start buying integrated systems. Competition differs depending on the situation, according to what roles each supplier has in providing instruments, separation media, application services, consumables, etc. Some actors, like Pharmacia Biotech, have established a stable position in the separation media area from the start. Others, like LKB Produkter, have started as instrument manufacturers but have successively complemented the product range with separation media. Companies like P-L Biochemicals developed stable positions in the fine chemical area only, with a focus on special reagents for molecular biology research.

Some customers - especially the academic organizations - have by tradition acquired instruments from a large number of different manufacturers, thus building up a mixed collection of products and supplier relations. It means that these users meet a number of different suppliers providing the instruments, the media, the accessories, and the application and technical services. Consequently, despite few, direct cooperation agreements between biotech suppliers in the late 80s, the companies often become linked via end users "assembling" their own, specific product systems. The introduction of new, highly integrated product systems in the middle of the 80s (e.g Pharmacia's SMART

system) somewhat decrease the possibilities for end users to combine the instruments from different suppliers. Customers using the instruments in applied research and in industrial processes also show less interest compared to e.g. academic users in basic research to "shop around" and create their own system combinations, including the separation of media and instrument purchases. However, in the 1990s the tendency to shop around and create their own product mixes is being observed also among industrial buyers. As noted by Pharmacia Biotech in 1994:²⁴

On the hardware front, we see increasing creativity on the part of bioprocess engineers toward mixing and matching hardware components, or moving toward custom or speciality columns. For example, one leading manufacturer of a drug recently approved by the FDA opted to use Pharmacia gels on columns made to order by a small, relatively unknown speciality supplier. Thus, in addition to the fact that bioprocess hardware are only really significant when a production line is being refurbished, this growing tendency among customers toward customization and to decoupling of hardware and media decisions could work to disperse hardware revenues among a much more varied set of suppliers.

A competitive situation which is at once clearer and yet more diffuse emerges in the period 1986-1993. The changing positions of companies in relation to different technologies (in both instruments and chemicals) renders analyses of the sector more difficult. Simultaneously, the increased structuring of the industry due to mergers and acquisitions results in the appearance of a number of larger, more visible, actors. Despite the large number of very small suppliers of chemicals and instruments for "down-stream" laboratory and process purification and separation still remaining, some dominating suppliers begin to appear on the international scene 1986-93. Pharmacia Biotech finds itself competing with a very diverse set of companies, with different business foci and different backgrounds.²⁵ A handful of the companies supply customers in several countries, while others have preferred to establish a strong, local position nationally as biotech suppliers.

In contrast to many mature industries, information about competitors in the biotech industry - their customers, products and application areas, etc. - remains fragmented, and the scope of comparative analysis to monitor competitors and their activities is generally limited throughout the industry during the 80s. The fact that manufacturers of biotechnical instruments and equipment develop competence in single or in several of the different "product areas" makes the classification of companies into well-defined groups a difficult

²⁴Pfund, N.E., "The Great Bioseparation Debate: Sound and Fury, Signifying...?" (1994) reprinted in *The Annual Review of Pharmacia Biotech*, 1995, pp. 22-31

²⁵See Appendix for a list of the major suppliers. Statements from Pharmacia Biotech's customers reveal a number of additional competitors: Sigma, Promega, NEBL, USB, Merk/BDH, NBL, Serva, Fisons, Flow, Behring, Biozym, Heraeus, Akzo, Sorvall, Kontron, M.Medical, Fice, Bracco, Prodotti Gianni, Mosha Brunetti, Aford, Bioblock and LDC. In the 1995 Annual Review (p. 24) a list is provided of the 12 major competitors emerging in the industrial process purification area - the area over which Pharmacia Biotech had dominated for years.

task. In addition, both biotech *suppliers* and *customers* sometimes appear in a number of different customer and/or supplier roles:

- Supplier of raw materials for separation media production
- Supplier of parts for instrument production
- Supplier of hardware and software components
- Supplier of consultancy and engineering services
- Manufacturer of separation media
- Manufacturer of laboratory consumables
- Manufacturer of laboratory separation equipment
- Manufacturer of process scale supplies
- Manufacturer of biotechnology supplies ("gene machines")

and as customers/users:

- University and college laboratories
- Research institutes and private R&D venture capital companies
- Clinical laboratories
- Governmental laboratories
- Pharmaceutical companies' laboratories and/or production departments
- Food and feed manufacturers' laboratories and/or production departments
- Chemical companies' laboratories and/or production departments
- Livestock and plant engineering companies' laboratories and/or production departments

As one of the central suppliers in the complex network of companies connected to biotechnology, Swedish Pharmacia Biotech finds itself in the situation of having to handle several of these roles. Despite the fact that changes in biotechnology, with molecular biology research as the important driving force, affect the organization, Pharmacia Biotech's separation and purification supplies are long established by the 80s as standard equipment also in contexts not driven by changes in the new biotechnology.

In the 1990s, it is possible to discern a shift in focus towards large scale separations in the biotech equipment sector, as more biotechnology drugs are beginning to leave the clinical stage and enter the market. It is reported that the pace of drug approval and commercial production is accelerating and the need for media used by biotech manufacturers is increasing:²⁶

Over the past several years, as the number of approved biotechnology drugs has moved into double digits, increasing attention has been paid by Wall Street to bioseparations - the industry that supplies essential tools to both the development and manufacture of biopharmaceuticals. Perhaps no segment has received more enthusiastic response than the process bioseparations segment,...

While Pharmacia Biotech has for years been the dominating actor in process scale separation, driven by the sale of chemical media used to pull molecules out of solutions (rather than the instrument hardware side of the business), new companies start to

²⁶Pfund, N.E., "The Great Bioseparation Debate: Sound and Fury, Signifying...?" (1994) reprinted in *The Annual Review* of Pharmacia Biotech, 1995, pp. 22-31

introduce media and instruments.²⁷ The constant refinement of existing media for so-called chromatographic separation (mainly used in some of the later stages of purification as compared to other separation techniques: membrane filtration, centrifugation, etc.) and the introduction of new varieties become new important driving forces. There is an open move towards the development of more precise, targeted separation media.²⁸ This means that the users, the pharmaceutical companies, tend in the 1990s to use two or more complementary suppliers of separation media, in different combinations for different purification steps.²⁹ Few industrial users spend more than 1 million dollars per year on media from only one supplier. The increasing competition becomes most apparent for suppliers when the users, the pharmaceutical process manufacturers, are preparing for clinical trials. Once the drug has been approved, the incentive to change media and maybe manufacturing process is very low, due e.g to the financial resources required to get the approval. (In 1994, Pharmacia Biotech had products used in all 22 FDA approved recombinant, biotech drugs in USA.)

The 1990s see a clear shift in emphasis regarding the needs for suppliers to combine and balance the revenues from the analytical (laboratory scale), pilot, and process media and instrument sales:³⁰

Revenues from these (hardware) sources, in fact, will tend to dominate a bioprocess separation supplier's revenue mix until the supplier gets a few commercial drugs to kick in and drive up media revenue volumes. Thus, these sources of revenue can be particularly important in the early stages of a company's growth, both for their own sake and because they help create a base from which to grow more sales as the drugs move through the R&D process.

This is reflected on the emerging trend among the pharmaceutical company customers to integrate internally:³¹

Furthermore, the continuum between the biotech analytical lab and the process development lab is not always an unbroken arrow; communication between these groups varies widely. This means that analytical media sales do not always signify the first step toward building a bioprocess media relationship.

²⁷Pharmacia Biotech points to two new, strong actors in 1994: PerSeptive Biosystems and Sepracor, *ibid*, p.23

²⁸As commented by Pfund in 1994: "Each biomolecule is different, and what works well for one may do little for another. Every media has a place where it is best, but no media is best at everything: no media is universally applicable. Thus, evaluating a media for use in commercial drug production is a study in trade-offs. These trade-offs include sensitivity (the ability to find all the drug molecules present), selectivity (the ability to pull only drug molecules, and not near look-alikes, out of solution), capacity and throughput (the ability to produce desired quantities in the optimal amount of time), and cost (measured not only in terms of cost per liter but also in terms of the analytical and maintenance overhead a given media requires). Related concerns center on the integrity and stability of the media, especially when reused (does it decompose or leach? does it behave differently over time?), its ability to be cleaned and decontaminated, and its ability to be stacked easily in larger column configurations." (In: *The Annual Review of Pharmacia Biotech*, 1995, p.25)

²⁹"...the various media used usually come from more than one supplier, with many of Pharmacia's, TosoHaas's and Sepracor's IBF products dominating the front-end initial capture and immediately following stages (which are the highest volume stages) and Pharmacia's, Toso-Haas's, PerSeptive's and Sepracor's products being used in the intermediate and toward the final (lower volume) stages. Pharmacia's and TosoHaas's gel filtration media are also regularly used at the final stages, known as polishing.", (*Ibid*, p.27)

³⁰*Ibid*, p.29

³¹*Ibid*, p.30

In this situation, new suppliers enter the biotech equipment and separation arena, bringing in technologies which compete with the established chromatography technology. In the 1990s, established suppliers also start looking for alliance partners in order to be able to compete with broader product systems.³²

TECHNOLOGICAL SHIFTS IN THE PHARMACEUTICAL-HEALTH CARE SECTOR

Almost 20 years after the crucial discoveries of recombinant DNA and monoclonal antibodies, the pharmaceutical industry begins to see the results of investments in the new biotechnology. In the beginning of the 1990s, altogether a dozen biotechnology based products are registered in the list of 65 drugs with sales above 500m dollars in the year 2000. In 1993, it is a fact that parts of the global pharmaceutical industry is going through a technological shift and that "some of the large pharmaceutical groups are building up considerable experience in biotech production".³³

A few years earlier, in 1987, only a limited number of biotechnology based pharmaceuticals reach the market, while over 100 new products are under development but have not reached the mass production stage. In addition, a large number of diagnostic tests (more than 200 in 1989) uniquely capable of detecting diseases have been developed with the help of new biotechnology. The products manufactured are initially of a low volume/high value character, but soon the range covers products down to the high volume/low value end of the scale. Despite the problems of developing economically efficient production processes - for new as well as for existing drugs - it is early acknowledged that modern biotechnology has the potential to change the technology paradigm of the health care sector and the pharmaceutical industry.

Some of the problems emerging in the pharmaceutical industry in the 80s become strongly connected to the costs of production and R&D operations. The pharmaceutical industry enters a period of general change in R&D orientation as well as production, including the links between R&D, production and marketing. During the breakthrough for biotechnology in the global pharmaceutical industry in the 80s, the industry enters a stage of apparent technological as well as institutional change:³⁴

³²E.g. Pharmacia Biotech's competitor in process separation, Sepracor, forms an alliance in the 1990s with the established laboratory chromatography supplier, Beckman.

³³*Financial Times Survey*, 22 April 1993, p.II

³⁴OECD Report 1989, p. 70

The pharmaceutical industry has been for some time in a state of change: from product supplier (principally drugs) it is becoming an industry of function or a health care industry (i.e. a supplier of a wide range of therapeutic products, diagnostics, auxiliary materials, equipment, machines, biomedical systems and technology). The scientific basis is more and more interdisciplinary: relying not only on chemistry, biology and medicine, but also on physics, electronics, computers, lasers, etc. These transformations have already brought with them problems of internal reorganization.....The organizational and institutional implications of this evolution are far-reaching.

The increased multidisciplinary base carries with it the parallel development of biological tests, automatised equipment and software data processing, i.e. an integration of biotechnology, microelectronics and telecommunications. The pharmaceutical industry increasingly finds itself competing with electronics industries in certain areas. The companies' biotechnological knowledge is increasingly becoming part of complex technological systems where the electronics industry and others successively become positioned at an advantage in relation to the pharmaceutical industry; the new complex product systems accelerate the development of new cooperation alliance based structures, mergers and also new competitive structures.

For most large, global pharmaceutical groups, biotechnology in a wide sense, emerges as the driving force in medical technology. Traditional chemical-based pharmaceutical production is increasingly being linked to the activities of biotech companies, through acquisitions and alliances, marrying biotech with chemical synthesis. By the mid 80s, it is clear that protein based, biotech drugs have weaknesses, are expensive and are hard to make. Later, it is widely acknowledged that important future drugs will be discovered and designed using advanced biotech techniques, but they will be made by established chemical synthesis. Biotech companies' interest in chemical engineering is reported to increase, transforming the companies' technological foundations, while established pharmaceutical companies put more effort into exerting control over biotech activities in general, through e.g. acquisitions.

These technological, and connected organizational changes emerge as part of the attempts to integrate basic R&D with down-stream aspects of the R&D process and with production and marketing activities. In the mid 80s, pharmaceutical companies report of attempts to introduce variants of what the advanced engineering industries call "concurrent engineering", to try to tackle the technical problems of development successively instead of sequentially, and while the medicine is in clinical trial.³⁵ The still long time it takes to bring a new drug to market - sometimes up to twenty years - accentuates the need for integration of activities, especially as institutional changes - changes in patent legislation - shorten the time until generic drugs reach the market.

³⁵*Financial Times Survey*, April 1993, p.VI

Increasing costs of developing new compounds require pharmaceutical groups to join R&D activities and to increase selectivity when choosing what therapeutic areas and compounds, including what biotech areas, to invest in. Companies begin in the 80s to look for ways to cut down on the number of studies and development projects and cut down on complexity. Selection processes become critical, leaving the traditional way in which big drug companies have screened thousands of chemicals to find one that would cure disease. Pharma-economists are increasingly brought into the clinical development process, increasing efficiency in the increasingly integrated development, manufacturing and marketing processes. Inter- and intra-organizational changes, including new international cooperation patterns in the global pharmaceutical-biotech industry complex, become obvious consequences of these technological and economic changes in the 1980s.

MEANWHILE: LONG-TERM STRUCTURAL CHANGES IN THE PHARMACEUTICAL INDUSTRY-MERGERS, CONCENTRATION AND INTERNATIONALIZATION

Intermingled with the development of the global biotech network, the most important industrial sector connected to it - the pharmaceutical industry - goes through some significant changes. Beside being connected to the network of companies and organizations involved in biotech activities, the industry is successively transformed from a pharmaceutical to a health care industry linking activities with companies engaged in both computer science and engineering. Increased competition, overcapacity, and problems with environmental issues also compel multinational chemical companies to approach biotech companies and compete in the pharmaceutical area.³⁶ It is argued that it might be the first step towards an integrated chemical-pharmaceutical industry in the year 2000, with the new biotechnology as link.³⁷

The 80s also become the decade of continued concentration in the pharmaceutical industry. Due to increasing R&D costs, needs to diversify product portfolios and needs for internationalization, large pharmaceutical companies continue on the road of acquisitions and mergers.

In Sweden, the merger in 1989 between Pharmacia and the Swedish Kabi Group becomes one of the major steps in the long-term concentration of the Swedish pharmaceutical industry, resulting in two dominating, multinational groups: Astra and Kabi-Pharmacia (later renamed Pharmacia). The restructuring of the Swedish pharmaceutical industry during the 70s and 80s moves along two connected lines;

³⁶Kenney, M., *Biotechnology. The University-Industrial Complex*, New Haven: Yale University Press, 1986

³⁷Schneider, N., "Scrambling on the gene train", *GEN I*, (Jan.-Feb.) 1981

increased internationalization in the 80s and a continued concentration and organizational merger of the Swedish pharmaceutical companies.

The Kabi-Pharmacia Group results from the long-term process of merging a number of well-known pharmaceutical companies with a long history in the Swedish market. On the Kabi side, a new pharmaceutical group is established in 1972 which after a fusion process in 1978 is renamed KabiVitrum AB. The state owned group has successively been created from the merging of four companies; Recip, Kabi, Vitrum and ACO (Figure 1.3.).³⁸

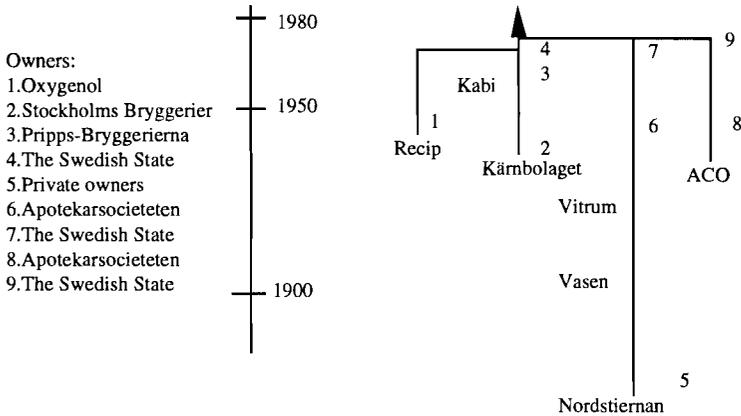


Figure 1.3. Concentration of the Swedish pharmaceutical industry; the formation of Kabi-Vitrum. (Some of the steps preceding the formation of the Kabi-Pharmacia Group 1990, source: Kabi-Vitrum Info, no 9, 1981)

Apart from the major internal reorganizations in the 80s - and including the creation of KabiGen AB in 1978 (a new company specialized in gene technology) and a major divisionalization and decentralization in 1985 - the Kabi group enters a phase of international orientation. Some of the major steps in the process are: cooperation agreements with biotech specialists in USA (e.g KabiGen-Genentech), joint-venture for production in China between Swedish Kabi, Astra and Ferrosan (1987), acquisition of American company Hepar Industries Inc.(1987), majority share in joint-venture with American company Baxter Inc.(1987) and takeover of venture in 1989, and lastly, Kabi take-over of majority share in German company Pfrimmer and KabiPfrimmer, established for R&D in the nutritions area.

When state owned Procordia (including the Kabi Group) takes over Volvo's shares in Pharmacia in the end of 1989 it opens up for a new radical step in the long-term restructuring process in the Swedish pharmaceutical industry. It means that the two major remaining companies of the Kabi Group, Kabi (with a history in Kabi, Vitrum and Recip)

³⁸Source: Kabi, e.g. "Våra rötter", KabiVitrum, Info nr 9, 1981

and ACO, enter a phase of coordination and integration, including the Pharmacia companies Pharmacia, Leo and Ferrosan, and the other biotech, diagnostics and R&D companies of the Pharmacia Group. The structural changes in the Pharmacia Group preceding the merger in 1989-90 mirror in some important respects those of the Kabi Group; internationalization processes in the 1980s and the continued concentration of the Swedish pharmaceutical industry have been part also of Pharmacia's long-term restructuring process.

In 1983, the Sonesson group acquires the Swedish pharmaceutical company Leo, continuing with the acquisition of Ferrosan in 1984. The same year, Leo and Ferrosan start coordinating some of their activities. Two years later, in 1986, Pharmacia acquires Sonesson's pharmaceutical division with the two companies Leo and Ferrosan. The fusion with the Kabi Group in 1990 becomes one of the last major steps in the concentration and consolidation of the Swedish pharmaceutical industry. The next major step in the restructuring of the industry takes place in 1993, but is of a different kind. For the first time, a major international merger involving a large Swedish pharmaceutical company takes place. Kabi-Pharmacia acquires and merges with Italy's largest pharmaceutical company, Erbamont (Erbamont Farmitalia Carlo Erba, Fice). Kabi-Pharmacia thereby enters a new phase in achieving global presence.

In conclusion, in the period 1988-93, the global biotechnology business environment is perceived by one of the suppliers - Pharmacia Biotech - as a period of "radical change". Less public funding become available for academic research and there is an apparent move to performance-related research and increased pressures for results. Academic research is restructured to be more productive and commercially oriented, with less money available for basic research and more for applied areas and industrial applications. Money is selectively spent in key areas chosen centrally, often by governments. A smaller number of larger research groups emerge; fewer and bigger labs buy multi-user equipment from fewer suppliers. Structural changes are being coupled with a more "industrial", purposeful attitude throughout the business, according to Pharmacia Biotech analyses. Academic scientists form industrial collaborations and academic institutes set up companies to commercialize their interests. In addition, new research projects more often become very large and also global in nature, with indications of a more apparent "win or lose" situation for suppliers of equipment for global projects. An increased rationalization of industrial research projects becomes coupled with a faster market growth in the industry than in other areas. Different types of industrial customers with different needs emerge, while the dilution of the customer base in traditional, basic academic research

continues. Customer demands for quality, reliability, low prices for standard technology supplies, and products adapted to specific research or application demands become important underlying driving forces for changes in the global biotechnology business. This is the situation for Pharmacia Biotech when it enters a period of radical reorganization of its marketing operations in 1989.

2 Radical Reorganization and Reorientation 1989-1993: Four Concurrent Change Episodes

In 1990, during the time when a new Managing Director for BTG, Pharmacia's new, large Biotechnology Group, assumes on his duties, a number of ongoing internal changes are given project status, and a number of new change areas are defined. The preceding MD - remaining only one year 1989-1990 - leaves an organization adversely affected by organizational problems, one of the latest concerning what to do about over capacity in the production organization. The new MD takes over an organization marked by three years of organizational mis-endeavours and now dangerously poor business performance levels.¹ Only a few years earlier, an unprecedented period of almost 15 years of continuous technological development and sales success has put its mark on the organization. In 1989, BTG enters a new period of radical and multiple changes, equal in scope to the ongoing merger with LKB Produkter AB, of which many are directed at the very core of the company's traditional marketing and distribution operations. However, the marketing changes emerge in the shadow of a more urgent organizational issue in 1990. In the face of major over capacity in production after the merger process, there is a need to take decisions concerning the future structure of production.

A capital management and physical distribution project is started with the purpose of establishing a whole new way of distributing the instruments, chemicals and accessories (Section III). Attention is also directed to existing and potential service activities. Programs are started with the purpose of looking over and redirecting BTG's application support and after sales services (Section IV). A number of additional projects complete the new focus on internal efficiency: total quality programs, implementation and standardization of EDI systems, changes in production, R&D and supply systems, and much more.

¹A year later, Procordia describes in its 1990 annual report the biotechnology group's results as unsatisfactory. It is openly reported as having low market growth, delivery disturbances, delays in new product launches, and considerable overcapacity in several functions.

The company also initiates a process whose aim is to restructure - to regionalize - and render more efficient and effective, the company's global net of marketing subsidiary organizations (Section II). In short, BTG enters a new phase in its internationalization process. In particular, the company implements changes which aim at radically modifying the old, country based system with few direct inter-subsidiaries contacts, establishing an integrated European marketing organization with a new central coordination and support unit in Brussels and more intense vertical contacts with the central marketing support and production units. The plans also include the restructuring of the units in the other major regions: North America, Far East and Japan. The organizational change aims at establishing a new logic for global presence, which to a large extent is driven by internal efficiency considerations, but also by the concurrent internationalization and global sourcing strategies of some of the company's most important customers, the biopharmaceutical companies.

The many strategic marketing change processes of the late 80s and early 90s do not develop undisturbed by changes in the organizational and industrial context. As a matter of fact, the whole Pharmacia Group becomes part of one of the largest business deals ever in Sweden, as Procordia and Volvo sign a pre merger deal in December 1989 which involves Volvo's shares in Pharmacia. Pharmacia becomes part of the Procordia conglomerate and the next major step in the restructuring of the Swedish pharmaceutical industry. In the process of merging Procordia-owned Kabi with Pharmacia, the Biotechnology Group is incorporated in a new holding company, Biosystems (Section I). The creation and subsequent dissolution of the Biosystems group strongly influence the ongoing marketing change processes in BTG. While the creation results in various organizational ambiguities and lost speed in the change processes, the dissolution opens up new opportunities to concentrate on the particular problems of the biotechnology supply units and to direct attention to new areas of change. The dismantling of Biosystems opens up for Pharmacia Biotech the opportunity to concentrate fully on stabilizing its own particular, ongoing marketing changes and direct attention to new change areas.

I. THE CREATION AND DISMANTLING OF PHARMACIA BIOSYSTEMS AB 1989-1992

RE-ORGANIZING PROCORDIA

Towards the end of 1989 and despite a number of successive organizational changes, the Pharmacia Group maintains its overall organizational structure based on the division into four major business areas: pharmaceuticals, biotech, diagnostics and ophthalmology.(Figure 2.1.)²

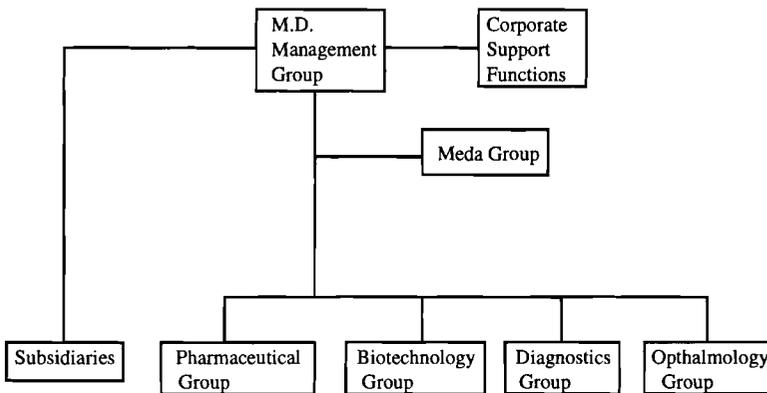


Figure 2.1. The Pharmacia organization 1989

The organizational structure of the foreign market subsidiaries generally mirrors that of their mother organization. That is, there are generally four local divisions/groups in each country, each handling separately their particular customer groups. An executive subsidiary manager consolidates all four business operations.

At the end of 1989, Pharmacia, including its expanding Biotechnology Group, enters a new phase of radical organizational change. When state owned Procordia and Volvo on the 12th of December announce and sign a pre merger deal involving the two companies' interests in the food and pharmaceutical industries (e.g Volvo's shares in Pharmacia), Pharmacia is mobilised into another organizational restructuring process differing in some respects substantially from those of the preceding period 1986-89. While the many mergers and acquisitions of the preceding period have been initiated and controlled to a large extent by Pharmacia, the Procordia-Volvo deal will result in a new organizational structure - officially presented in June 1990 - heavily dominated by the ruling Procordia strategy. Pharmacia is integrated in the Procordia Group's division into Health Care,

²Meda is Pharmacia's Nordic sales company for foreign suppliers of pharmaceuticals and medical equipment

Food and Service. Within the Health Care Group, Pharmacia's pharmaceutical business units are merged with Kabi's. A special Group, Pharmacia Biosystems AB, is created from Pharmacia's Biotechnology Group, Diagnostics Group, Pharmacia Deltec, Biosensor, and from Kabi's minor diagnostics unit,³ and is placed alongside the new large group for pharmaceuticals, Kabi-Pharmacia AB. (Figure 2.2.)

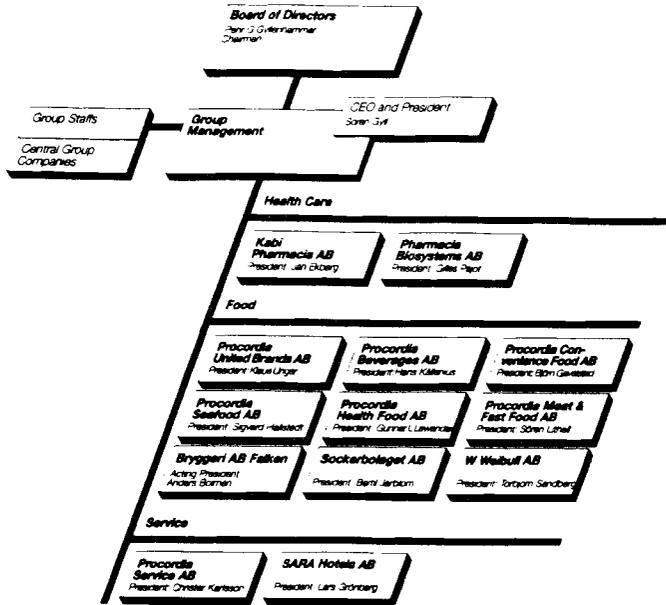


Figure 2.2. Pharmacia in the Procordia Group 1990

The new organizational change processes that are propelled by this, the largest business deal and merger ever consummated in Sweden, come to influence, intervene in, redirect and put a stop to several ongoing marketing change projects in Pharmacia's Biotechnology Group. The pre-merger process that is started during the spring of 1990 marks the beginning of two years of endeavours to shape the new Procordia conglomerate. Problems of grouping companies in order to achieve most efficient coordination and synergies, to establish efficient vertical contacts with merging marketing subsidiaries, implement new control systems and new divisions of work, and to reshuffle managers, management levels and power distributions, come to dominate the internal change processes.

During the spring of 1992, and partly as a result of the problems to implement Pharmacia Biosystems AB, Procordia introduces a new organization. In the Annual Review of 1991, the reorganization is presented:⁴

³Presented in detail in the next section.

⁴Annual Review 1991, p.5

The purpose of the changes is to trim and streamline the business structure and to effect concentration on the core areas of pharmaceuticals and food. The new organization is being introduced against the background of the rapid changes taking place in Europe and will result in greater coordination of units for the utilization of synergies in product development, marketing, distribution, production and purchases. The number of business areas is reduced from 10 to 6.

Among other changes, Pharmacia Deltec and Pharmacia Diagnostics are transferred from the Biosystems group to Kabi Pharmacia, the new pharmaceutical giant. Pharmacia Biotech is the name given to the business unit formerly part of Biosystems and now comprising only biotechnology related units. Pharmacia Biosystems AB, created in late 1989 as a result of the Volvo-Procordia deal, is dissolved when the new Procordia organization is presented in 1992.(Figure 2.3.)

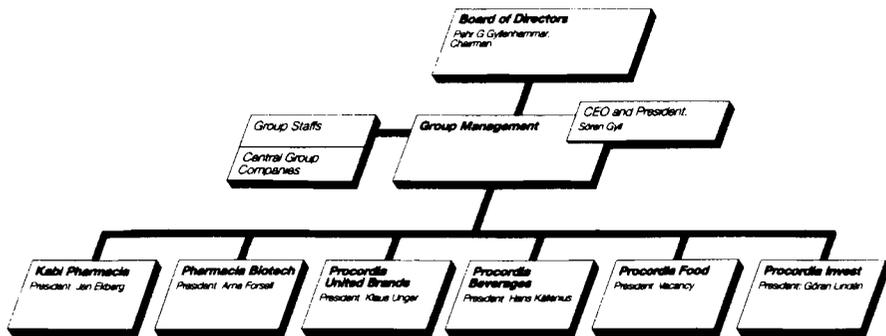


Figure 2.3. The Procordia organization 1992

For Pharmacia's biotechnology units the organizational change in early 1992 means both that the company returns to an organizational situation similar to that preceding the Volvo-Procordia deal and the creation of Biosystems, and the start of something new. A number of radical marketing and distribution change processes are resumed and stabilized, while attention concurrently is directed to new areas for change. For example, as a consequence of customer and general market changes, BTG's old and established, triadic division into Pharmacia LKB Biotechnology (laboratory products), Pharmacia BioProcess (industrial, process scale products) and Pharmacia P-L Biochemicals (molecular and cell biology research products) is being questioned.....

MERGING PROCORDIA, PROVENDOR AND PHARMACIA

The 12th of December 1989 marks an important event and radical change in the history of the Pharmacia Corporation. This day it is officially announced that Procordia is preparing plans for merging its business activities with those of Pharmacia and Volvo's food

business in Provendör. It is to become the largest Swedish business deal ever, encompassing Procordia's diversified business portfolio, Volvo's wholly owned food company Provendör and Volvo's 30 per cent shares (46 per cent of the votes) in AB Pharmacia. It is announced that Procordia is paying 15,3 Billion SKr for the Pharmacia shares and 8,5 Billion SKr for Provendör. Volvo is to be paid in Procordia shares, giving Volvo a total share of 40 percent, while the State reduces its shares in Procordia from around 80 to 40 percent. The result is a new corporate giant, Procordia, with 47,000 employees and a total yearly sales of 37 Billion SKr. Official comments on the deal point to the fact that the actual acquisition part of the deal is probably going to be one of the easiest to handle. It is expected to require much more efforts to actually merge and restructure the business units and operations of the three corporations.

The deal is officially described as "natural steps" in the historical development of the two main actors, Procordia and Volvo, and of the companies belonging to the two conglomerates, for example Procordia's pharmaceutical Kabi Group and Pharmacia. The fusion process cross-links a number of long-term, stable processes of change of the companies and the industries they are positioned in: food, pharmaceuticals and biotechnology being the most central in the change. The involved companies' long-term paths, processes and procedures for responding to their changing economic, social, political and technological contexts come together, pushing the processes in new directions. The cross-linking also results in tensions, internal political struggles, new divisions of power and control, structural ambiguities for people in the organizations, and in many cases to efforts to retain existing structures, relations, rules and traditions. For Pharmacia's biotechnology group, the internal processes following the event of 1989 become indirectly connected to the transformation resulting from changes in the Procordia and Volvo conglomerates, and subsequently to the changes affecting the pharmaceutical companies of Kabi and Pharmacia.

CROSSLINKING PROCESSES OF CHANGE IN PROCORDIA AND VOLVO

The origins of Procordia can be traced back to the year 1969 when the Swedish government assembles most of its corporate interests in the Statsföretag holding company:⁵

A highly motley group of companies in such diverse industries as mining, pulp and paper, tobacco, engineering and textiles then ended up under the same umbrella organization.

⁵*The Symbol of Strong Brands*, Procordia 1991, p. 5

During the 70s, Statsföretag often finds itself having to operate companies under the threat of closure, companies which for various reasons the government considers needed to be rescued. In general, the business results for the companies in the group are weak, and for a number of years in the 70s and early 80s, Statsföretag continues to show red figures. During the first years of the 80s comes a change and 1984 is generally described as the year for the turning point.⁶ A new management group is appointed which receives the go-ahead to operate the company on a purely commercial basis. The company is renamed Procordia and a far-reaching restructuring operation is launched. During the period 1984-1986, about 50 companies are sold and nearly 25 companies are bought. Between 1984 and 1987 - just before the introduction on the stock exchange - the Procordia Group's annual profit doubles. In 1985 the foundation for a new strategy is laid.

From a varied portfolio of business areas it is decided to focus on a small number of prioritized areas. The aim is to create a group where the business areas strategically and financially can support each other. Food and Pharmaceuticals/Health Care will be the two mutually supporting business areas. It is this foundation that is developed during the latter half of the 80s, ending with the Volvo deal at the end of 1989. Beside a large number of food companies, Procordia owns in 1985 the Swedish international pharmaceutical corporation, Kabi-Vitrum, and the latter's subsidiary ACO Läkemedel AB is sold to Procordia with effect from January 1, 1985. Procordia continues to acquire companies in the Food sector (Pripps and Pinkerton) and selling off companies outside the core business. The strategy is accentuated to let the steady profit-generating food and tobacco business support and counterbalance the resource and capital demanding pharmaceutical activities, with their large profit potentials. One of the most significant processes of the late 80s in Procordia, which is accentuated with the pre-merger deal in 1989, is the strive to create a more integrated New Procordia, leaving behind the tradition of being a diversified conglomerate. It is not until the late 80s that Procordia starts the transformation from holding company to an international, more integrated concern. Despite the build-up of central management control and support functions, the Procordia Group remains a conglomerate of companies with different backgrounds, cultures and market situations.

In contrast to Procordia, whose major steps into the pharmaceutical industry are taken in the early 70s, Volvo's engagement in the Swedish pharmaceutical industry emerges during the 80s. The engagement is demonstrated most openly in 1985, when Volvo

⁶For a more detailed historical account of Procordia's dynamic period 1984-1994, see: Östman, L., *Procordia - Visioner och handlingar på vägen från Statsföretag till nya Pharmacia*, Malmö: Liber-Hermods, 1994

acquires 40 percent of the shares in AB Pharmacia. Volvo's entry into the Food sector goes back to the beginning of the 80's in the fusion with Beijer. During this time - despite open criticism of the strategy on a number of occasions - Volvo-Provencor continues to acquire food companies. Like Procordia, diversification based on synergies between contra cyclical business operations - in Volvo's case related to vehicles, pharmaceuticals and food - becomes the dominating strategy. The strategy is accentuated in the first deal with Procordia in 1989, but the process is interrupted in the second step at the end of 1992 when Volvo and Procordia announce a second step and a new deal between the two conglomerates. The deal is considered part of Volvo's preparations for the partnership and fusion with French Renault. Both deals fail and Volvo's long-term differentiation strategy is broken. The new managing director starts the process of divesting and selling out companies not related to cars, trucks or buses, keeping also the interests in Volvo Penta, Volvo Aero, VME and Catena.⁷

Procordia's and Volvo's respective actions in the pharmaceutical and in the food sectors during the second half of the 80s are affected by the global development in the two areas. The global pharmaceutical industry structure is rapidly changing. Mergers and alliances between companies create larger global corporations, handling the rapidly increasing costs of developing, testing and registering new products. In the food sector, on the other hand, a deregulation process, in Europe and other regions, supports the internationalization process of large multinational food conglomerates. During the years preceding the Volvo-Procordia deal in 1989, both companies attempt to acquire a number of European, later Nordic, food companies, however without any significant results.⁸

The merger between Procordia, Pharmacia and Provencor in 1990 stabilizes the emerging Procordia strategy to develop strong and mutually supporting footholds in the pharmaceutical and food sectors, with increasing centralized coordination and control. (An international comparison at the time of the merger indicates that few foreign conglomerates are based on the same strategy to combine the two areas.) The non-related business activities which still remain are collected in a third group, Service, including security and hotel operations. During the years that follow the deal, negotiations on a closer cooperative relationship between Procordia and Volvo continue.

On another level in the two conglomerates, the premerger deal of 1989 comes to affect mostly the ongoing processes of change in the two pharmaceutical/biotechnology groups, Kabi and Pharmacia.

⁷*Dagens Industri*, 29 June 1994, p. 12-13

⁸The major exception is Procordia's deal with the Finnish company Cultor.

CROSS-LINKING PROCESSES OF CHANGE IN KABI AND PHARMACIA

The single most important, internal change resulting from the Volvo-Procordia deal of December 1989 affects the two pharmaceutical groups, Kabi and Pharmacia. In one sense, the merger can be seen as, and is officially presented as, the next, "natural" step in the concentration and long-term restructuring of the Swedish pharmaceutical industry, in light of the long-term changes in the global industry. On another level, the merger comes to spotlight the difficulties, both in a static and in a dynamic sense, of merging two pharmaceutical groups with different historical backgrounds. The different organizational cultures, formal structures, power structures, technologies etc. openly affect the merger and the merger also cross-links a number of ongoing processes of change in the two company groups. Due to the fact that these ongoing processes have reached different phases of development some of the changes are inhibited. The total merger process is also affected by this. It is complicated and is in some cases inhibited by the difficulties to join the forces of the ongoing processes of change in the internationalization, intraorganizational rationalization and restructuring, and in the ongoing vertical coordination of the marketing organizations.

In contrast to Pharmacia, Kabi finds itself in quite a different phase concerning the involvement in the long-term concentration and restructuring of the Swedish pharmaceutical industry. In 1972, after the take-over by the State and its holding company Statsföretag AB of Kabi (1969), and the two pharmaceutical companies Vitrum and ACO from Apotekarsocieteten (1972), the three companies are joined under the control of the same conglomerate. In the history of the companies, similar steps of growth through merger and concentration have preceded this event.⁹ In 1976, Statsföretag AB begins the process of merging the three companies Kabi, Vitrum and ACO - all with quite different industrial, technological and organizational backgrounds - a process which is extended over several years, resulting in a new merged organization in the beginning of the 80s. In 1983, the organization of the new, integrated pharmaceutical giant, named Kabi, begins to function as a unified company.

In Pharmacia, the long-term involvement in the restructuring of the Swedish pharmaceutical industry is in a different phase of development in 1989.¹⁰ Not only the company's pharmaceutical units but also the diagnostics and the biotechnology units are all still constrained by and in the process of handling the organizational effects of a

⁹For example, Kabi's merger with Oxygenol and the daughter company Recip in 1964.

¹⁰A more detailed description of the emergence of the Pharmacia Corporation is presented in chapter 8.

number of acquisitions in 1986. In the pharmaceutical area, Pharmacia is still in the process of creating the unified Pharmacia Leo Therapeutics of the former pharmaceutical units of Pharmacia and Leo/Ferrosan. An important remaining problem concerns the fusing and restructuring of the central organizational units in Uppsala, Malmö and Helsingborg, some with quite different technological backgrounds. Similar merger problems continue to effect the diagnostics and biotechnology units; the merger with LKB in the biotech organization, and the problem of combining the units for both allergy diagnostics and immunodiagnostics in the new Pharmacia Diagnostics.

The fusion processes that Pharmacia finds itself in from 1986 and onwards, have strong similarities with a process which Kabi entered ten years earlier and comes out of in the early 80s.

As part of the fusion processes, both Kabi and Pharmacia initiate radical organizational rationalization processes during the 80s. Both become involved in organizational changes whose objectives are to achieve a more efficient use of internal resources and develop new internal coordination routines, spurred by increasing competition and a need for radical cost reductions. Also these processes of change appear contra-cyclically in the two organizations, however, with somewhat shorter time lags compared to the merger processes. Kabi enters a period of radical rationalizations and reorganizations in 1985-86, taking the company through a turbulent period when new, more "industrial" economic control systems and routines are introduced. The processes are spurred by a number of unexpected market and product drawbacks in 1985. Just when Kabi comes out of the process with a new efficient organization in 1989, Pharmacia takes the first radical steps into capital rationalizations towards the end of the year, just a few months before the announcement of the Volvo-Procordia deal.

The situation in 1989 as regards the processes of establishing positions in the international arena is quite the reverse. That is, in the two companies' ongoing internationalization processes, Pharmacia is by far the most internationally experienced and firmly established. While Pharmacia's heterogeneous, international market organizations for pharmaceuticals, diagnostics and biotechnology have been built up over decades, since the end of the 40s, Kabi's market organizations for pharmaceuticals begin to emerge over two decades later and are in 1989 still relatively small organizations concentrated to the European market. Two small, wholly owned, market units in Japan and USA and 11 in the European market (Norway, Denmark, Finland, Germany, France, Spain, Great Britain, Holland, Belgium, Switzerland and Austria) add up to 13 subsidiaries complementing the sales via agents in the rest of the world. Like Pharmacia,

Kabi begins formulating a more open strategy for the organization and positioning in Europe towards the end of the 80s. However, the two companies' organizational and marketing strategies for Europe are based on different prerequisites and underlying ideas.

In Kabi, the European strategy is based on the idea of growth; Kabi must become bigger and more powerful in order to be able to compete with the other pharmaceutical giants in Europe. Acquisitions and internal growth are to be coupled with a market strategy whereby large, powerful subsidiaries with local resources, not only for marketing but also for research and production, are established in the largest European markets: Germany, UK, France, Spain and Italy. Outside Europe, the positioning strategy is to be based on the strong and stable alliances with local partners. In Pharmacia, on the other hand, the emerging ideas about the way the European market organization shall be organized in the future become closely connected to needs for rationalization and ideas about the integration of the European market. The idea that the old country based system should be modified, sub-regionalized and heavily reduced and rationalized - is born in the late 1980s. The European subsidiaries shall be slimmed, and against the background of more international customers, there is also a need to increase coordination between local market organizations. In Pharmacia, the situation is somewhat more complicated though, by the fact that the local connections between marketing units for pharmaceuticals, diagnostics and biotechnology remain, mainly manifested in the fact that local subsidiary managers have the consolidated responsibility for all three units.

Kabi's growth strategy and positioning in Europe also takes off with the acquisition of the German pharmaceutical company Pfrimmer in 1988. The acquisition is preceded by a long-term marketing and distribution agreement with the company covering the German market. The only major international acquisition preceding this event is the take-over of Bayer owned Miles Laboratories' shares in the American joint venture with Kabi, Cutter Vitrum. However, for special products in certain local markets Kabi has signed a number of cooperation sales and distribution agreements.¹¹ The next major step in Kabi's European expansion strategy occurs in 1989 when the company acquires its former sales alliance partner in Spain, Fides. The process of merging the Kabi, Pfrimmer and Fides market organizations in Germany and Spain is started in 1988-89, just before the announcement of the Volvo-Procordia deal. Thus, the international expansion through two minor acquisitions takes off in Kabi in the late 80s. In Pharmacia, the same international expansion process through mergers and strategic alliances takes off in the early 80s, with apparent peaks in 1982 and 1986, when several companies in the

¹¹ Kabi and Pharmacia have already before 1989 signed an agreement concerning distribution by Pharmacia of former Vitrum products in the North American market.

pharmaceutical (e.g. Leo), diagnostics (e.g. ENI) and biotech (e.g. LKB Produkter) business areas are acquired.¹² In 1989, the company is still in the process of getting the Group's organizations to adapt to these events.

Differences between Kabi and Pharmacia towards the end of 1989 are also noted in phases reached in the internal organizational change processes, including the changes in vertical contacts between central and local market units in the two groups. Kabi's divisionalization into Nutrition, Biopharma, Pharma, ACO, Kabi Diagnostica and Kabi Invent is set during the period 1986-1988. The new specialized business units with close contacts between R&D, production and marketing are born during the period in a new organizational culture much more openly driven by strict economic control systems, centrally and locally. The new, stricter, "industrialized", economic control of the local marketing organizations is largely implemented in 1989. In Pharmacia on the other hand, the organizational consequences of the difficult mergers have by this time left the organization in a situation which requires changes that re-establish the reduced contacts and information exchanges between the central support units and the local market subsidiaries and customers.

The technological change processes - some of which are closely connected to the re-organizations in the two company groups between 1986 and 1989 - also indicate both similarities and radical differences between the two. While Pharmacia's position within the new biotechnology has emerged over decades and to a large extent has been driven by Pharmacia's role as supplier of laboratory and process separation and biotech products, and less by the pharmaceutical units, Kabi has taken another path into biotechnology. The company becomes one of the three first companies in the world to produce on a large scale a therapeutic pharmaceutical based on the new hybrid DNA technology. The growth hormone Genotropin which is manufactured and marketed through a cooperation agreement with the American biotech giant Genentech adds in the late 70s to Kabi's long-term engagement in growth hormones.

During the period 1986-89, Pharmacia enters new paths in the pharmaceutical area. The acquisition of Leo/Ferrosan connects Pharmacia to new technological areas related to smoke cessation, oncology and urology/gynecology. Both Kabi's and Pharmacia's pharmaceutical operations are step by step becoming more diversified. The former's position as one of the forerunners to apply the new biotechnology in pharmaceutical production is matched by the latter's firm foothold as supplier of products to the companies active in the new biotechnology all over the world.

¹²A complete list of Pharmacia's major alliances and acquisitions 1980-1990 is presented in the Appendix.

THE MERGER PROCESS

The Volvo-Procordia deal and the creation of the new Procordia are not without problems. The main problems are observed in the process of merging Kabi's pharmaceutical organizations with Pharmacia which has a diversified set of operations centered around biotechnology and the breakthroughs in the new biology. Disagreements and complications in the process connect to the problem of finding an organizational structure for the new Procordia, taking into account the different backgrounds and emerging strategies of Procordia, Provendora, Kabi and Pharmacia. One of the major obstacles concerns Pharmacia. In the pre-merger discussions during the first half of 1990, discussions concern the future structure of Pharmacia. The old, established strategy and idea of strong inter-divisional connections, technological interdependencies and synergies between the operations of the pharmaceutical, diagnostics and biotech divisions comes under scrutiny. The Procordia and Kabi management groups and external consultants involved in the merger question the strength of these synergies which have been officially presented by Pharmacia since the 70s, following the emergence of and orientation towards the new biotechnology, in the late 80s renamed "the new biology".¹³

Before the merger, the calculated merger profits are expected to be generated in the pharmaceutical/health care sector, including Pharmacia's biotechnology and diagnostics units. It is openly acknowledged that the merger is only one step in the process of creating a large, internationally competitive pharmaceutical company. Future acquisitions and mergers are to be expected.

The preparations for the practical fusing of the Kabi and Pharmacia operations are intensified in January and February 1990. External consultants are called in to help organizing the process. Initial doubts about the merger come mainly from the Pharmacia organization and executive representatives in the central planning group. Formally, the deal can not be concluded before Procordia's annual share holders' meeting on May 10, 1990 and the first half of the year is devoted to intense corporate planning. Procordia's own analysis made for the so-called Pre-Merger Agreement is complemented with the planning for a number of change projects involving the companies of the three groups Procordia, Provendora and Pharmacia. The project groups are put together mainly of management representatives and focus on the identification of the main strategic business areas and the overall operative organization structures that will support the new

¹³For example, in annual reviews 1978 and onwards.

corporation's business groups. Procordia's open goal is to leave behind the old holding company tradition of Statsföretag AB and create a new, more integrated, Procordia with fewer but stronger and more competitive business areas. This also includes a more standardized organizational structure, and a stronger and larger supportive corporate management group. One of the single most important points in the pre-merger planning process concerns the risks of losing pace in all the ongoing sales processes. The merger shall not interfere in the sales processes, necessitating a smooth and fairly rapid fusion process, involving both the central and the local marketing units from the beginning.

The future organizational and management structure is presented to the various divisions during the spring of 1990. It is decided that apart from nine business areas of a new Food Group and three companies in a Service Group (including hotel, catering, cleaning and security companies), a Health Care Group consisting of three business units - Kabi Pharmacia AB, Pharmacia Biosystems AB and Meda AB - shall be formed. The new structure presented by the central planning group, heavily dominated by the analyses made by Procordia and the external consultant group is, simply put, based on the idea of similarities between business operations.

In the Health Care Group, Kabi Pharmacia AB shall encompass the traditional pharmaceutical operations with specialized doctors, hospitals, and pharmacies and pharmaceutical distributors as customers. The operations are all strongly affected by regulations, including extensive clinical testing, patenting and licensing, all central characteristics of the global pharmaceutical industry.

The same logic of similarity lies behind the proposal to form Pharmacia Biosystems AB. Despite the more apparent heterogeneity of the Biosystems companies' customers - including hospitals and clinics (Pharmacia Deltec), private and public researchers and clinical laboratories (Pharmacia LKB Biotechnology, Pharmacia P-L Biochemicals, Biosensor, Sebia, Kabi Diagnostics, Pharmacia Diagnostics, Wallac, Biochrome) and process industries (Pharmacia BioProcess) - the similarities concerning products (apparatus and chemical products) and institutional situation (a more deregulated and less controlled business) motivate the formation of the group, according to the plans for the new Procordia organization. It is also speculated that the new organizational structure reflects concessions made to minimize internal political debates concerning management positions and the appointment of chief executives on different levels in the organization.

The presented plans also include ideas about a new, more standardized structure for the integrated local market subsidiaries and control structure for the contacts between the

central and the local units. The old Pharmacia structure, with a subsidiary executive manager responsible for the consolidated business in the country is far from the new, proposed structure. The new merged subsidiaries (i.e. local Kabi and Pharmacia organizations) shall have a highly decentralized cost and profit responsibility for each business unit. However, they are to be controlled by local business area managers (e.g for Biosystems) who report back to each of the central business support units (e.g for biotech, diagnostics etc.) who in turn report to the central business area executive (e.g to the new, central Biosystems unit in Uppsala). The consolidated result of Pharmacia Biosystems AB and of Kabi-Pharmacia AB shall be measured. In some countries, Kabi Pharmacia AB and Pharmacia Biosystems AB will have to share the costs for offices, etc., but in the plans the two shall be managed, as far as possible, as two separate operations. Although not openly admitted, the new so-called "Straight Tube Concept" governing the contacts with the subsidiaries, is a way for the new central management groups to break an old Pharmacia tradition. The strong, local power of the subsidiary executives is weakened.

The internal debates concerning the new structure intensify towards the middle of 1990. While the ideas and arguments to establish a new large and specialized pharmaceutical giant come to dominate (according to long-term Kabi plans and strategies), the new structure means in practice that the old established Pharmacia organization is divided in two parts. The old idea of technological synergies and interdependencies between the pharmaceutical/medical, diagnostics and biotech operations has to be abandoned...

BACKGROUND: FORMING PHARMACIA'S STRATEGY AROUND "THE NEW BIOLOGY" 1987

During the second half of the 1970s, the Pharmacia management openly begins to formulate ideas about the apparent "synergism" existing between the three major divisions of the company: the separation products division, the diagnostics division and the pharmaceutical division.¹⁴ Despite a rapidly expanding organization in the 1980s - through acquisitions and mergers - the idea of strategically important interdependencies between the three divisions, tied together by complementary positions in the advancing new biotechnology, remains strong. Although continuous organizational changes come to characterize the 1980s - continuously finding new and better ways of grouping and regrouping the three major divisions and their increasing number of sub-units - Pharmacia

¹⁴In the introductory, empirical part of chapter 6, the moving organizational context of Pharmacia Biotech is described. The emergence and change of the Pharmacia Corporation 1911-1990, including the emerging, internal interdependencies between the major internal divisions, are described.

sticks to the idea of strong technological interdependencies. In 1987, the idea is taken even a step further, as the new Pharmacia Company Philosophy is outlined in an intensive analysis of the company's competences and strategic opportunities. In the final version of the documented company philosophy (corporate purpose and strategies, long-term objectives, growth, organizational philosophy and basic beliefs), this cornerstone of Pharmacia's strategic thinking becomes based on the idea of the whole company being tied together by its many complementary positions within the so-called "New Biology".¹⁵

Documents are circulated within Pharmacia in 1988, stating the long-term visions, ambitions and basic management values. Two interrelated ideas are repeated and stressed: Pharmacia as driven by the advent of "the New Biology", and the latter being the single most important factor and reason for keeping together and cross-fertilizing the operations of the biotech (separation products), the diagnostics and the pharmaceutical units. The Pharmacia base shall be to grow with and within The New Biology.¹⁶

In recent decades, the base of knowledge of the life sciences has undergone an unprecedented expansion. Scientific interest has increasingly been focused on the very fundamental levels of life: the understanding of how biological cells function and interrelate. We call the result of this development "The New Biology"...Pharmacia is represented in all the industrial segments which, over the next few decades will derive the most benefit from and influence research in, The New Biology: pharmaceuticals, medical devices, diagnostics and biotechnology supply.

There is also a belief that in the market, many technological areas and organizations formerly disparate and separate would be joined by progress in The New Biology:¹⁷

The New Biology is largely the result of, and demands, joint efforts on the part of specialists in different areas, areas who have traditionally worked separately. The New Biology brings together the basic researchers at universities, the applied clinical researchers and the industrial product developers...The New Biology means working together in interdisciplinary groups: medical clinicians, biochemists, immunologists, genetic engineers, etc. The New Biology fuses diagnosis, therapy and follow-up in medical research. To Pharmacia, all this is nothing new. Combining the strengths of therapeutic and diagnostic competences has long been an important part of our business thinking. Close contacts with universities have always been an important factor of success for Pharmacia. Cross-fertilization is in our blood...

The New Biology, and the increasing internal and external linkages between science areas, motivates a strategic integration - technologically as well as organizationally - of Pharmacia's pharmaceutical, diagnostics and biotech supply operations and organizations:¹⁸

From its biological pharmaceutical origin, Pharmacia has grown organically into its new business areas, while still maintaining strong internal links. In a way, Pharmacia is a microcosm of the

¹⁵"The Pharmacia Company Philosophy", final version, April 30, 1988, pp. 1-28 (excluding appendices)

¹⁶Ibid, pp.1-2

¹⁷Ibid, p.2

¹⁸Ibid, p.2

whole biotechnical and biomedical scientific community...That is why Pharmacia's strengths extend beyond the simple sum of its component parts...The New Biology and our ability to utilize the combined strengths of Pharmacia, while remaining competitive in our chosen business areas, will be decisive for the Company's future long-term success...

The use of in-house synergies and internal cross-fertilization between the biotech supply organizations, the diagnostics organizations and the pharmaceutical organizations is believed to give the company a unique competitive edge in the strategic plans up to 1995. Management at all levels is openly requested to be more aware of what is good for the Group as a whole and "to 'preach' this at the appropriate time."¹⁹ Lists are provided, highlighting a number of actual and potential synergistic opportunities between the three business groups and within the subsidiary companies.²⁰

Only two years later, during the pre-merger process and in the actual integration of Pharmacia in the Procordia Group, the strengths of the ideas behind The New Biology, of the potential of internal synergies, and of the whole philosophy of keeping together Pharmacia's three basic business areas, will be openly questioned and criticized. Can synergies really be stimulated in the way they had been described? Did the market and customers really behave in the way described? Did the descriptions of The New Biology really comply with reality? In the strategic discussions in Procordia when Pharmacia is merged with Kabi, the grand plans outlined for Pharmacia within The New Biology from 1987 and onwards are abandoned...

PROCORDIA IN JUNE 1990: THE MERGER AND REORGANIZATION PROCESS-TAKE OFF

After the official merger contract has been signed in June 1990, attention in the Health Care Group is directed at the international marketing organization. The merger of the international pharmaceutical sales operations is started in June-July 1990. Most of this work - including relocalization of sales units and reduction of the organizations - is completed in late 1990/early 1991. For the Biosystems units in the local Pharmacia subsidiaries, including the old sales units for biotech, diagnostics and medical equipment, the uncoupling from the pharmaceutical units now continues as Pharmacia's and Kabi's subsidiary units for pharmaceuticals are merged.²¹ In most countries, the merger of

¹⁹Ibid, p.23

²⁰Ibid, Enclosure 2

²¹In June 1990, a proposition is presented, summarizing country by country how the new organization with one Pharmaceutical and one Biosystems entity should be managed. It is suggested that 1) when practical and financially sound, these entities will be legal, incorporated units, 2) when practical, the Pharmaceutical and the Biosystems Groups will be located together, and 3) when possible, one of the Groups will sell administrative services to the other. The analysis and suggestions vary and show sometimes big differences between countries, e.g. **Finland**: the Pharmaceutical Group from Kabi and Pharmacia is combined and the head of Pharmacia becomes the head of this new group. Biosystems is managed as branch offices in the Diagnostics and BTG

Kabi's and Pharmacia's sales organizations for pharmaceuticals is coupled with a radical reductions of sales personnel and with rationalization programs. The process of establishing new pharmaceutical sales organizations, in some countries including also research and manufacturing units, develops in different ways in different countries. Thus, Pharmacia's marketing organizations for biotech supplies become directly involved in adapting to the new Pharmacia Biosystems organization, while concurrently handling the indirect effects when integrated marketing units are created for Kabi Pharmacia.

Organizational adaptations caused by the merger take place during 1990 and 1991. The year-end of 1991 is the start of radical changes in Kabi Pharmacia's position in Italy. The company acquires 71 percent of the Italian pharmaceutical company Pierrel S.p.A. from Fermenta AB. Italy is rapidly becoming one of single most important markets. Even more radical changes are to come, when the company announces the acquisition of Italy's leading pharmaceutical group FICE, i.e. Farmitalia Carlo Erba in Italy and Erbamont Inc. in USA with subsidiaries, in March 1993. New integration and fusion processes start, affecting not only the local Italian organizational units. Kabi's long-term plans set up in the late 80s for strengthening the marketing and production organizations in Europe, before directing attention to USA and Japan, are pursued.

The concurrent fusion of the home organizations for marketing and subsidiary support and the production units in Kabi Pharmacia is more complicated. Plans are to couple the fusion process with a rationalization program in order to reduce costs by 500-600 MSkr by the beginning of 1993. In total, 1500 employees are to leave the new pharmaceutical company Kabi Pharmacia AB, of which 800-900 are working in the Sweden based units. According to plans, the main part of the fusion activities is to be completed during 1991. Some of the more complicated processes, for example, moving some of the pharmaceutical production from Uppsala to Helsingborg and handling the process which began with the problems of merging Pharmacia's and Leo/Ferrosan's pharmaceutical operations, are to be completed during 1992 and the first half of 1993.

The planning, the actual plans produced, the communication and the fusion process all come to be heavily dominated by the striving to take a radical step towards the formation of a new, technologically diversified, Sweden based, global pharmaceutical giant with the name Kabi Pharmacia AB.

Nordic organizations. Diagnostics will relocate to BTG. A potential relocation of BTG and Diagnostics to the Pharmaceutical location is studied. **Germany:** Two locations for Kabi-Pharmacia, in Ratingen and Erlangen. New decisions concerning the location of K-P will be made during 1991. A separate integrated Biosystems entity is established in Freiburg. **Canada:** One combined entity for Kabi-Pharmacia, BTG and Diagnostics.

MEANWHILE: TRYING TO IMPLEMENT THE BIOSYSTEMS GROUP OF PROCORDIA HEALTH CARE 1990-1992

From the end of 1989, through the pre-merger planning process, and from the official establishment of Pharmacia Biosystems AB in June 1990 until the early spring of 1992 Pharmacia's biotech supply operations go through major organizational changes. The practical integration and change process, based on the initial corporate analysis, is started during the second half of 1990 and continues with varying intensity throughout 1991. The next, major organizational change is officially introduced in Procordia in February 1992 and means that the group of Biosystems companies is dissolved. The plans for the latter change emerge towards the end of 1991. Pharmacia Biosystems AB as an integrated business group is never fully implemented.

The official idea behind Biosystems is to create a central holding company for a group of, (mainly Pharmacia) companies and business operations with similar production and product characteristics and with similar market characteristics, by which is meant that the market is less regulated as concerns registration and pricing procedures. In contrast to Kabi Pharmacia AB, the lead-time to develop new products is shorter, varying between a few months up to five years. In practice, it means that Pharmacia's business units for biotechnology, diagnostics, biosensors and implantable pumps and infusion instruments are combined with Kabi's diagnostics operations.

The internal discussions following the presentation of the new Biosystems Group indicate ambiguity concerning the underlying purpose and logics of the new group. It is rumoured in some of the Biosystems companies 1) that the construction comes as an indirect result of, a "residual", from the creation of the new large pharmaceutical giant, Kabi Pharmacia AB; 2) that Biosystems is the collection of non-pharmaceutical companies which together balance the power and domination of Kabi Pharmacia AB in Procordia's new Health Care Group; 3) that the two major units of the Health Care Group also reflect adaptations and concessions to problems of finding a new functioning management and power distribution structure.²²

The implementation of Biosystems coincides with a number of major internal, organizational and external market changes, differing between the companies of the group. The market for biotech equipment continues to be hardpressed and the whole,

²²It is also rumoured within the Biosystems organizations, that the Group only reflects the new, Procordia dominated pharmaceutical group's ignorance of the Biosystems organizations' highly motley configuration of backgrounds, complex technologies, traditions, customer groups, market conditions, and so on.

global biotech supply industry enters a period of levelling or even diminishing sales.²³ All companies of the Biosystems group become involved in rationalization programs to meet demands for higher internal efficiency and to deal more effectively with the intensifying competition. Hence, the internal organizational fusion processes of Procordia as a whole, of the Health Care Group, of its two holding companies Kabi Pharmacia and Pharmacia Biosystems, and of the many individual companies of the latter two, come to be intertwined with concurrent rationalizations and reorganizations.

The official agreement between Volvo and Procordia is signed in June 1990 and it signals the real take-off for the creation of Pharmacia Biosystems. An executive manager is recruited, the former manager of Pharmacia Development Company, a unit connected to Pharmacia's US organization. During the autumn of 1990, four vice executive managers are also appointed with responsibility for communication, business development, finance, and personnel and organization. The purpose is to establish Pharmacia Biosystems as both a control and support unit for the different business units. One of the clearly stated tasks is to support the various companies of the group in the already ongoing rationalization and reorganization processes.

When, during the late 1990 and the spring of 1991, attempts are made to implement Pharmacia Biosystems AB, it is a matter of finding a coordinative structure which links a completely new holding company unit in Uppsala with new units with consolidated Biosystems responsibility at regional - including a new European regional office in Brussels - and local (subsidiary/national) levels. In parallel to this, each single Biosystems company is responsible for the development of functioning vertical relationships to support local marketing and sales groups in their contacts with local customers.

Towards the end of 1990 there are totally seven companies, and an equal number of executive Managing Directors, that are to be incorporated in the new holding company Pharmacia Biosystems:

1. Pharmacia LKB Biotechnology
2. Pharmacia Diagnostics
3. Kabi Diagnostica
4. Wallac Oy
5. Sebia S.A.
6. Biosensor
7. Pharmacia Deltec

²³Described in chapter 1.

Pharmacia LKB Biotechnology is by far the single largest of the seven companies. The new, externally recruited (August 1990) executive manager for this company, the former Biotechnology Group of Pharmacia, is responsible for five units and each of which are larger in size than many of the other companies of Pharmacia Biosystems in 1990:

Chromatography Division (Uppsala)
 Pharmacia LKB Biochrom (Cambridge, UK)
 Electrophoresis and Molecular Biology Systems Division (Bromma)
 Molecular and Cell Biology Division (Milwaukee, USA, Pharmacia P-L Biochemicals)
 Process Separation Division (Uppsala)

During the spring of 1991 a more detailed structure for Biosystems is outlined and five change projects are outlined. The basic principles behind the new structure are presented: increased market- and customer orientation, cost-efficiency through structural change, broadening and strengthening of management, support core business and be international in scope and competence. The creation of Biosystems should coincide with the introduction of two decentralized regional marketing companies: Pharmacia Biosystems Europe and Pharmacia Biosystems North America. The official purposes are to "get closer to the customers", "better prioritize and utilize resources" and "strengthen our market position".²⁴ Five projects are outlined, given project leaders and are started for different parts of the organizational change process:²⁵

Project **Coordination of the Swedish Operating companies**
 Project **Establish Pharmacia P-L Biochemicals as an Operating company**
 Project **Region Europe**
 Project **Region North America**
 Project **Steering and Administrative systems**

In May 1991, a detailed list of potential areas for coordination and cooperation between the different biotech, diagnostics and medical device companies of Pharmacia Biosystems AB is presented.²⁶ Time schedules are set for the late summer for an increased coordination and integration of activities and resources. Seven areas for internal coordination are set: R&D (instruments), instrument production, administration and logistics, quality, after sales support (instruments), personnel and organization, and "general". Different, specified tasks for this coordination are distributed, depending on area and depending on the various constellations of Biosystems companies where the potential for coordination can be envisaged. For example, recommendations are set for the start of coordination within Biosystems of after sales support. This would encompass

²⁴"New Organization Structure - A Step in the Right Direction", internal material presented to Biosystems executives spring 1991.

²⁵Ibid

²⁶Internal memo, "Potential areas for coordination and cooperation within Biosystems' units in Uppsala - preliminary conclusions, May 1991

BTG, Diagnostics and Deltec and concern development of products and services, guidelines and policies, administration and reporting, reference file for after sales, spare part administration, and training. Similar recommendations are made for the other six cooperation areas, however in varying company constellations. The coordination process should be started as soon as possible.

During the spring of 1991, the new, small holding company management group is put in place. During the summer and fall the same year Pharmacia's former subsidiary manager in France is called in to help develop a common overall business strategy and a common Biosystems business concept for the whole Group. For many and for shifting reasons, the venture proves utterly difficult. While regional (for example, in Brussels for the European region) and local Biosystems managers are being appointed during the period, the organizational change is never given enough time to be established as formal coordinative structure. During the fall 1991, the organizational ambiguity reaches its peak; the different companies of the Biosystems Group make their own interpretations of the strength of the new organizational concept. While some single companies in the group and some of the foreign market subsidiaries begin the task of adapting to a formal Biosystems organization, others continue to operate as usual, often due to the increasing needs to adapt to rapidly changing market conditions. While the new, integrated, pharmaceutical Kabi Pharmacia sales organizations are finally established during the fall of 1991, efforts to find functioning local organizations for the Biosystems units are never fully effected.

Meanwhile during the autumn, the boards and top managements of Kabi Pharmacia and of Pharmacia Biosystems are calling for a joint study concerning the interface between the two groups and possible organizational implications. In December 1991, proposals are presented to executives of the two groups suggesting that new organizational and operational structures are considered for: Biotechnology, Allergy, and Deltec & Parenterals.²⁷ The differences between the three Biosystems areas are acknowledged. Coupled to an analysis of the three technology and market areas, executives are requested to prepare for a transfer of the diagnostics units to Kabi Pharmacia and for Deltec to become an operating subsidiary to Kabi Pharmacia Parenterals. Now, the special situation and market conditions for the biotechnology units are acknowledged:²⁸

In summary, the business is facing harder budget times in the life science research community and a maturing of the industry requiring focus on assortment rationalization, cost effectiveness and reduction of M&A costs without losing the innovation edge. In the industrial area the

²⁷"Kabi Pharmacia and Pharmacia Biosystems - possible change of structure", internal memo, December 18, 1991

²⁸Ibid

pharmaceutical and the biotech industry is the most important customer group. This business is not subject to price control. It is global. It is different from the rest of Biosystems.

A list of issues is presented to which responses from the executives are called for, each list specific for the Biotech units, for the Diagnostics units and for Deltec and Pharmacia Parenterals of Kabi Pharmacia. The board and management report of December states that seven issues need responses in the biotech group.²⁹

One month later, in January 1992, the major issue in the ongoing dissolution of Biosystems concern decisions needed as regards the best corporate home for Wallac and Biosensor.³⁰ The new emerging organization is intermittantly renamed The New Pharmacia Biosystems:³¹

The New Pharmacia Biosystems (PB) will be an operative business entity with a clear focus on the biotech supply market segment...In order to concentrate on its core businesses, it has been suggested to transfer Wallac and Biosensor to the new entity "Procordia Invest"....The long term strategies for the businesses of Wallac and Pharmacia Biosensor respectively should be an important starting point for the decision regarding a transfer.

It is also acknowledged that Wallac and Biosensor represent two clearly different situations and each has to be handled and decided on its own merits. Separate Wallac and Pharmacia Biosensor activities are to be concluded by May 1992.

The biotech supply operations of Pharmacia Biosystems thus enter a very turbulent phase during the second half of 1991. All biotech units enter a phase of rationalizations and radical changes in both internal organizations and operations, while having to adapt to and keep up sales in an increasingly competitive situation. Concurrently, the units are affected indirectly by the new changes in the diagnostics units, and thereby also by the new changes in the pharmaceutical units of Kabi Pharmacia.

Among the many reasons for the subsequent dissolution of the Biosystems Group by early 1992, the internal differences between the different companies are difficult to disregard. Not only do technologies, organizations and customers and customer contacts differ radically, but the companies are also in different phases of organizational development:

²⁹I.e. the structure of the European regional market organization, the structure and organization of the regional European company, structure and organization of the HQ of the business area, cost reduction possibilities as a consequence of the new structure, strategy and operational plans for 1992, incl. restructuring activities, the budget, incl. restructuring costs, and consequences in marketing companies concerning adm., landlord agreements, facilities etc., *ibid*, p.2

³⁰Internal memo, January 20 1992, pp.1-5

³¹*Ibid*, pp.1-2

-In the *biotechnology* group, rationalization programs are started in order to cope with the earlier decreasing profitability. The last phase of closing down the former LKB organization in Bromma is concluded 1991, and in all biotech organizations the processes of reducing the number of employees is intensified. The problems are most apparent in the chromatography, electrophoresis and molecular biology systems divisions. The process separation unit and the molecular and cell biology units also intensify the rationalization programs, but customer and market conditions are somewhat more positive. Several divisions find themselves competing intensely in a mature market with laboratory customers with reduced (and more concentrated) research grants. For the former LKB owned company Biochrom in Cambridge, the period is characterized by uncertainty. In the long-term strategy formulated for Pharmacia LKB Biotechnology, divestment is decided upon. If a suitable buyer can be found for Biochrom, the company will be sold.

-In the group of *diagnostics companies*, the turbulence during the second half of 1991 is linked to other changes. The problems in the Finnish, former LKB company, Wallac continue; there are problems of finding a central headquarter structure divided between Pharmacia's diagnostics units in Uppsala and Wallac's Turku based organization. At year-end, all headquarter and production activities of the most important operations, the immunodiagnostic DELFIA system, are transferred to Turku. During the same period of time, the American operations in Pharmacia Diagnostics Inc., (former ENI), are sold or closed down. The same applies to Sebia S.A. in France, engaged in clinical electrophoresis and to Kabi Diagnostica's operations in Mölndal and Studsvik in Sweden. While most former diagnostic companies are involved in the planning for Biosystems during the spring of 1991, only nine months later, it is obvious that all diagnostics units not related to Pharmacia's traditional technology area, allergy diagnostics, are being sold, closed down or transferred from the Biosystems Group.

-The *biosensor* operations in Biosensor, Uppsala are in quite a different phase of development during the same period of time. After almost seven years of product development in a completely new technological area, the first biosensor measurement, instrument, BIAcore, is launched in 1991. During the first year, around 45 instruments are sold to research institutes and pharmaceutical laboratories in America and Europe. Gaining the acceptance of the new advanced technology is Biosensor's main problem, and the company is in 1991 starting to build up a completely new organization, oriented towards sales and marketing to complement the domination of R&D and production resources. Sales and support is largely handled by the existing R&D dominated organization in Uppsala, giving strong support to a few, carefully chosen customers. The

organizational belonging of Biosensor remains uncertain during the planning for Biosystems.

-The *infusion products* business of Pharmacia Deltec with headquarters in Minnesota, USA, is the most stable and successful in the Biosystems Group in 1990-1991. Deltec keeps its position as one of the world leaders in the area of ambulatory drug delivery by relying on its local American customers. In 1990-91, plans are made for the first serious attempts to establish a stronger position in the European market. While plans for Biosystems emerge, plans are concurrently developed for the creation of a specialized sales organization in Europe. In 1989, the small Pharmacia Deltec International support unit that has been established in Uppsala, is transferred to Pharmacia Deltec Inc. in St Paul in Minnesota. In the beginning of 1990, Deltec's international sales is however still under the control of Pharmacia Therapeutic's organization in Uppsala. During the latter half of 1990, Deltec takes the step to establish itself as a complete operating company with its own sales organization. Specialized sales groups, under the control of local Biosystems units in the subsidiaries, are recruited, concentrating on Europe, Japan and Canada. The local sales units are divided in four regions with four regional managers responsible for each region and reporting directly to the new, international support unit in St Paul. The regions are: Germanic Region (Switzerland, Germany, Austria), Northern Europe (Belgium, Denmark, Finland, Netherlands, Norway, Great Britain, Sweden) Latin Region (France, Italy, Spain) and rest of the world (Australia, Japan, Canada, other countries). A medical director for Europe is employed and is positioned in Biosystems in Freiburg. Successively, Deltec takes over the marketing responsibility from Kabi Pharmacia for the countries without wholly owned marketing subsidiaries.

Towards the end of 1991, despite serious attempts, the difficulties in implementing Pharmacia Biosystems as a holding company with an overall business philosophy are apparent. The changes in the diagnostics companies and in Pharmacia Deltec are indirectly, and later directly, linked to concurrent changes in the new pharmaceutical giant, Kabi Pharmacia. The internal reorganizations and regrouping of internal units continue in Kabi Pharmacia and are accentuated by the acquisitions of the Italian pharmaceutical company Pierrel and the rest of Pfrimmer & Co at the end of 1991. In addition, the similarities and technological connections between Kabi Pharmacia's pharmaceutical sales and Pharmacia Diagnostics and Pharmacia Deltec are openly being acknowledged. The infusion solutions of former Pharmacia (e.g. Macrodex and Rheomacrodex), the nutrition products of former Kabi, and the other products of Kabi Pharmacia Parenterals have strong user connections with Pharmacia Deltec's pumps and infusion devices. In connection with plans for a transfer of Pharmacia Deltec and the

remaining Pharmacia Diagnostics companies to Kabi Pharmacia towards the end of 1991, radical changes in the Kabi Pharmacia organization are to be expected during 1992.....

DISPERSALS AND DIVESTMENTS 1991-1992

During the late fall of 1991, it is decided that a new organization shall be effective as of January 1992. For the Biosystems Group, this means that all the diagnostics units and Pharmacia Deltec are transferred to Kabi Pharmacia of the Procordia Health Care Group.

In February 1992, the new organization is presented and commented on by the Kabi Pharmacia President:³²

The primary purpose of the new structure is to enable better use of business opportunities through the combination of units serving similar customer groups and having similar requirements and possibilities of development.

There is an emerging notion that the four business areas within Biosystems do not have a common customer base. For example, the diagnostics and Pharmacia Deltec products are sold mainly to health care organizations and thus, equal in this respect more the Kabi-Pharmacia Group. However, in retrospect, the speculations within the organizations concerning the reasons for the dissolution of Biosystems and the transfer of Pharmacia Diagnostics and Pharmacia Deltec do not only circle around the customer differences. The need to change internal power and management structures, managers leaving the organization, the need to create an even bigger and more powerful pharmaceutical group, and even speculations whether it is the first step towards a divestment and sales of the whole remaining biotech business, circulate as rumours within the organization. The increased difficulties in establishing Biosystems as an integrated business group results in a new reorganization, planned for and implemented in the beginning of 1992.

The fall of 1991 is turbulent for Pharmacia Biosystems. In August, the appointed manager for the new group resigns. A new manager, a former manager of the French subsidiary, is called in to take over the responsibilities. However, within the organization, the confidence in the Biosystems organization is weakened. And the new Biosystems manager begins to question the logic behind the organization; it is acknowledged that the diverse set of business units are acting in an equally diverse set of market situations. The opportunities to create internal synergies are, according to the analyses made, relatively limited. In late 1991, the discussions start to dissolve

³²*Panorama*, Feb. 1992, p. 2

Biosystems. Also in the Procordia management group, discussions concerning the future organization of Procordia will come to deal with the logic of the Biosystems organization.

The Biosystems process has attracted much attention and efforts. In the new organization, Pharmacia Deltec and Pharmacia Diagnostics are transferred from Pharmacia Biosystems to Kabi Pharmacia. The other, remaining units of Pharmacia Biosystems form a specialized biotech supply enterprise, Pharmacia Biotech, encompassing the core of Pharmacia's original biotech supply related business activities. The executive vice president of Biosystems is appointed President of the new separate Pharmacia Biotech business unit. The new President has been on the Boards of all the product companies of Biosystems, has been engaged as consultant in many of the change projects started in 1989, and in 1992 has provided some of the necessary continuity now needed in the biotech supply organization.

As a consequence of the transfer of the diagnostics operations and the return to and concentration on Pharmacia's traditional allergy diagnostics, transfers and divestments of former Biosystems companies are begun. The problems and turbulence in the formerly so successful immunodiagnostic LKB company Wallac - resulting in a number of strikes in 1990 - are not immediately resolved. R&D and marketing of the DELFIA immunodiagnostic system is in a first step transferred in their entirety from Uppsala to the mother organization in Turku. Wallac is also transferred within the Procordia Group. From January 1992 it is to report to a newly established holding company for non-related business areas within Procordia, Procordia Invest. The concentration of efforts within the diagnostics operations has in a short time replaced earlier aims of expanding in other segments of the market. In 1992, Procordia starts looking for a buyer of Wallac. Already effective as of January 1, 1992, three new owners gain access to Sebia S.A., Pharmacia Diagnostics Inc. and the operations within Kabi Diagnostica which have not been discontinued in 1991. Pharmacia Biosensor, whose products now are in the commercialization phase, is to report directly to Procordia as a business project.

Within Pharmacia Biotech remain Pharmacia LKB Biotechnology (laboratory supplies), Pharmacia BioProcess Technology (process supplies) and Pharmacia P-L Biotechnology (the Milwaukee molecular and cell biology operations). There are plans to sell the British company Biochrom within the laboratory instrument group. Discussions are initiated with a US company, but the price is too low and the deal is never concluded. Biochrom's instrument business, the spectrophotometers, remain in Pharmacia Biotech. The former plans to keep the earlier so successful instrument business of Wallac are now changing into open divestment plans.

The Procordia organization presented began to be implemented in 1990 and 1991 is in some areas radically revised in early 1992. A totally new, formal organizational structure is presented in the spring, now encompassing six broad business areas: Kabi Pharmacia, Pharmacia Biotech, three business units for the food operations and one unit, Procordia Invest in which companies and subsidiaries without clear synergies with pharmaceuticals and food are grouped. For the new biotech supply company, Pharmacia Biotech, it means that a major step towards concentration is taken. That is, a new, largely independent biotech supplier is emerging with focus on laboratory and industry scale separation chemicals and supplies, and with a strong foothold in molecular biology reagents and equipment. This time, the transfer of organizational units has greater effect on the pharmaceutical units within Kabi Pharmacia. The transfer and take-over of Pharmacia Diagnostics and Pharmacia Deltec is coupled with new reorganizations within the large, diversified pharmaceutical group. Nearly all organizational units within Kabi Pharmacia are affected by new reorganizations, except the Ophthalmics operations; Therapeutics, Peptide Hormones, Parenterals, and the new units Diagnostics and Deltec. Another unit, BioPharma, is dissolved as a business group. The new foreign acquisitions also contribute to the continuing organizational changes within the growing Kabi Pharmacia. For Pharmacia Biotech, the indirect effects of these organizational changes are successively losing importance....

EFFECTS ON ONGOING BTG CHANGE PROCESSES

Most of the radical organizational and operational changes for the biotech operations that are outlined by the newly appointed BTG manager and the different project groups in the fall of 1989 are in the planning stage or are just being initiated as the merger of Procordia, Pharmacia and Provendora is announced. The plans for the new Procordia corporate structure are being drawn during the first half of 1990, and most of Pharmacia's operations and change projects are initially unaffected by the deal. Plans are made on a higher corporate level and do not disturb directly, for example, the marketing and distribution changes that the new progressive BTG's CEO has organized for in different change projects. For the biotech operations, the organizational effects of the Volvo-Procordia deal are initially mainly *indirect*. Focus is on the fusion of Pharmacia and Kabi, which means that the most significant merger efforts have to be put into the pharmaceutical operations. These operations have successively been separated from other activities both in the central Pharmacia organization and in the marketing subsidiaries, and are little operationally connected to the biotech and the diagnostics operations. Kabi and Pharmacia are both engaged in diagnostics operations (Kabi in blood virus diagnostics

and Pharmacia in allergy and immunodiagnostics), but the fusion of these activities come to no direct effects on ongoing BTG changes. Some minor organizational links between the two operations exist in some subsidiaries, but will have no significant effects on the reorganization processes taking off. In the fall 1990, much attention is directed at the biotech supply organizations production units and the overcapacity which has to be solved in one way or another. The organizational adaptations which BTG has to make as the Biosystems Group is to be implemented and a new production organization is created, come to have different effects on various short- and long-term changes in the biotech organization.

For example, a distribution project, the Capital Rationalization Program, which has been given a strong internal support, is reaching the implementation stage at the end of the spring 1990, and the project manager and his associates in the task force group are about to start their tour of visits to the marketing subsidiaries, implementing new distribution routines from the production units to the end users.

The new After Sales Division's change projects have not reached the same stage. The take-off comes towards the end of the year, after a big international BTG meeting at Grisslehamn in Sweden, and after the appointment of a new divisional manager for the After Sales Service Division. In October and November 1990, the Division's preparations for a change of the service support activities are intensified. The actual changes will come later, and thus, after the capital rationalization changes have taken off in the subsidiaries.

A so-called Regionalization program is started, in which the European market organizations are to be supported by a new intermediary Biosystems support office in Brussels. The new European organization is to be effective in June/July 1991, and the regionalization process requires new contact patterns to be institutionalized between subsidiaries, regional offices and central support organizations, later also involving the customers.

In addition, the Biosystems organization requires a stable control and reporting system for the four main business groups within Biosystems: the Biotechnology Group, The Diagnostics Group, Pharmacia Deltec and Biosensor. The big differences between the market subsidiaries complicate the system for reporting back to the home organization. Some subsidiaries are reporting as commercial units to the Biosystems' management. In addition, some subsidiaries are large enough to keep separate BTG units and thus report back to the central BTG unit in Uppsala. In smaller subsidiaries, BTG and Diagnostics are more integrated and contact patterns overlap. In the same way that the pharmaceutical

operations in the subsidiaries successively have come to be disintegrated from the other activities, the four Biosystems operations are gradually becoming more disintegrated. Only in some cases do customer groups overlap. Thus, some of the clinical laboratories have both biotech instrument and diagnostic instrument users.

Biosystems is initially intended to be a holding group organization, with minimal interference in the ongoing sales and business operations. However, towards the end of 1990 and during the first half of 1991, there are tendencies to abandon the idea of Biosystems as a pure holding group unit. That is, attempts are made to create a more operational Biosystems organization at both central and subsidiary levels, and from the middle of 1991 also at regional levels when the Brussels office is established. The attempts are later abandoned as it is acknowledged that the factors that join the biotech and the diagnostics business are few. In all, almost two years are spent on working to implement the Biosystems operational organization before it is acknowledged that a new, more customer oriented, division and grouping of units has to be implemented.

The adaptations made in the different ongoing BTG projects to the Biosystems re-organizations differ. The distribution change group has to accept the fact that a new organizational structure is coming, but decides to go on with the project which is reaching implementation. The support for this important project from both the first BTG manager and the Biosystems management guarantees the continuity of the project. For changes which are in an earlier phase, e.g. the after sales project, adaptations are made mainly in the preparatory work. One of the problems which the after sales division needs to sort out concerns the division of work between BTG and Diagnostics and the other Biosystems units, mainly BioProcess, Pharmacia Deltec and Biosensor. All units are engaged in the marketing of instruments which need service support, and parts of the preparatory discussions in the central After Sales Division are focused on the way service support shall be divided and coordinated. The laboratory instrument group controls the main part of the central and subsidiary resources for support services, but the other units also have, or are beginning to invest in, service personnel. The discussions and preparations continue but no major decisions are taken concerning formal adaptations to the Biosystems Group organization.

After the Biosystems venture is dissolved, the regionalization program comes to have strong structural effects on the emerging Pharmacia Biotech organization. Concurrently, the rationalization and internal efficiency improvement programs continue. Even more radical efforts to improve effectiveness are made. Quality programs and orientation towards key account management systems are some of the overt signs that within the

complex moving structure, Pharmacia's biotech supply operations are entering a new stage in the ongoing processes of marketing change.

MEANWHILE IN THE BIOTECHNOLOGY GROUP: ONGOING PROCESSES OF MARKETING CHANGE.....

In the midst of all the organizational changes affecting the whole Pharmacia Group from 1989 and onwards, the biotech organizations of the former Biotechnology Group attempt to break with many established organizational and operational traditions. One major strand of the many BTG changes is the attempt to achieve radical improvements in internal efficiency, manifested in changes in distribution, logistics and internal information exchange routines. Another strand concerns aspects of effectiveness, improving and adapting the output to BTG customers. Some of the forerunners to this multitude of interconnected change projects to improve efficiency and effectiveness can be traced to the preceding problems of merging BTG and LKB. However, the radical changes in marketing routines between 1989 and 1993 can also be conceived of as a consequence of an accumulated need for adaptation, originating further back in time. The former Separation Product Division, resulting in the Biotechnology Group, has been on the technological forefront for almost two decades, committed to the development of technologically advanced separation supplies, thriving on stable sales increase and high prices. The many organizational and operational changes which are aimed at the core of the marketing activities from 1989 and onwards, are the signs of a painful awakening. The Biotechnology Group is rapidly turning into an industrial supplier among many, with higher demands for both internal cost efficiency and high quality output.

The radical, in parts revolutionary, events that lead the Biotechnology Group onto new roads of development do not emerge as easily defined and delineated change projects. A multitude of change actions taken by a great many divisions, groups and individuals create what could appear as a chaotic period in the history of the company. Almost every individual in the organization is mobilized for some kind of organizational or operational change.

This time, the radical changes do not only *reach* the core of BTG's marketing and physical distribution activities; many of the most important and urgent changes directly involve the company's marketing and distribution operations, resources and modes of organization. For example, BTG enters a new phase in the internationalization process, resulting in a new "regionalized" organization of the former country based subsidiaries. With the advent of a new integrated European market, some of the most significant

organizational changes in the so-called Regionalization Program are adaptations to this new situation in Europe. Another important event concerns the company's physical distribution activities. The difficult situation that the biotech supply company finds itself in requires radical improvements in the efficiency and effectiveness of the distribution of products and services. The so-called Capital Rationalization Program, efforts to tear up the old distribution and capital management routines, becomes an important motor in the processes of developing a more efficient, "industrial" way of using internal distribution resources. Among the many other change projects started during the period - quality improvement projects in line with ISO 9000 standards, changes of EDI systems and changes in administration and information exchange routines - a minor project to change the company's little developed technical service operations emerges. A new After Sales Service Division is established to develop completely new ways to deal with the long-term service support to customers.

From the point of view of BTG's marketing and distribution activities, the times are exceptional. In the midst of the Volvo-Procordia deal and the creation of Biosystems appear a multitude of events which together bring about a radical breach in continuity in the marketing history of the biotech supply organization. The Regionalization and Capital Rationalization Programs, and the creation of a functioning After Sales Service Division are three interconnected episodes in a complex net of change processes.

II. REGIONALIZATION-ENTERING A NEW PHASE OF INTERNATIONALIZATION

PRELUDE AND FORERUNNERS TO THE REGIONALIZATION PROJECT OF 1990

When the idea is brought up in Pharmacia LKB Biotechnology in 1990 to reorganize the international marketing and sales organizations into regions in order to increase efficiency and coordination, it is nothing new in the Pharmacia Corporation. Four years before and only one and a half year before the Pharmacia-LKB merger, in June 1985, the LKB management group announces internally that as one in a number of organizational change projects in the radical restructuring of the LKB organization, the sales subsidiaries and distributors are going to be divided into five regions. The idea is to form groups of sales companies in order to:³³

better be able to exploit the united experiences we have from markets with similar structure by creating an active cooperation within the region.

The idea has been discussed in the LKB organization during the preceding year and the aim is to increase the cooperation and exchanges between sales organizations within each region, while also making use of the fact that central support to the subsidiaries in each regional group can be coordinated and made more efficient.

In June 1985, LKB's regionalization process reaches the stage when decisions are taken to form five regions. Regional managers for three of the regions - number III, IV and V - are appointed. The five regions are (central regional organizations in italics):

- I. *Sweden*, Denmark, Finland
- II. *W.Germany*, England, France, Italy, Belgium, Holland, Switzerland
- III. *USA*, Canada, Central America, South America
- IV. *Austria*, Eastern Europe, Soviet Union, Middle East, North Africa, India, Cuba
- V. *Hongkong*, China, Japan, Far East

The appointed managers - the "regional directors" - are all chosen from among the subsidiary directors, which in practice means that they are given the responsibility for both the local subsidiary and for the Region as a whole. The two remaining regional directors are appointed within the next twelve months. For example, as manager for the important Region II is appointed the subsidiary executive manager of the powerful West German subsidiary.

³³*LKB-Aktuellt*, nr 330, 1985-06-28

The implementation of LKB's regionalization program takes place in a relatively turbulent period of time in the organization. LKB has started the implementation of the most radical organizational restructuring since the end of the 70s. The overall aim of the process is to create a "market adapted organization" and create the shortest possible communication links between those responsible for sales in the subsidiaries, and product development and marketing in the central support organizations, mainly in LKB's Bromma organization.

The central management unit in Bromma and the regional directors of each of the five regions organize the first intra-regional meetings in 1985-1986. In September 1986, the subsidiary executive managers of Region II meet in Bromma under the lead of the German regional director, in order to decide on strategies, budgets for 1987 and to exchange information about each others' business activities, to be able to plan for future changes. The regional director is to function as coordinator, but is also given the overall responsibility for sales volumes, resource development, the organization within each sales subsidiary, and for coordinating the regional marketing strategies together with the two business area managers in Bromma responsible for the newly formed business units Research&Industrial and Clinical.

Three months after the meeting and in the middle of the first steps to form the new regional market organizations, the merger with Pharmacia is announced. The development of the merger process during the coming months puts a stop to LKB's regionalization process as it has been outlined in the plans. However, many of the original regionalization ideas remain in the organization with the former LKB personnel.

Concurrently in Pharmacia BTG, the regionalization ideas have not reached the same stage. However, coordination between regionally close subsidiaries is not new in 1985-86. In the 70s, various coordination groups have been appointed and meetings between subsidiaries are normal. From time to time, meetings had been arranged by the different business units, e.g. by the process division of Pharmacia Fine Chemicals. Furthermore, meetings had been arranged between the European subsidiary managers on a regular basis, a European Club had been formed, and ideas on a regionalization of the marketing and sales units have before 1989 emerged also at local levels in the organization. Thus, in 1988, informal discussions are started in BTG's organization in Japan on some form of cooperation between the Far East units. Despite the centralized control, the BTG subsidiaries have in general developed quite independent positions both in relation to the central HQ units and in relation to each other.

Important factors preceding the regionalization project in the new Pharmacia LKB Biotechnology Group, are the concurrent, institutional changes in both the European and North American regions. The integration of Europe is advancing both politically and economically and like many other Swedish multinational corporations, Pharmacia and the BTG division are confronted with the questions how to establish a position, and what position to establish, in the important European market. In North America, the Free Trade Agreement between the United States and Canada is a similar external change which is generally assumed to open up a number of new business exchange opportunities between the two countries. Discussions on more open borders to the south are also in progress. It is also noted that many of Pharmacia LKB Biotechnology's industrial, pharmaceutical customers are successively going in the same direction, coordinating activities across national borders in Europe. The very large pharmaceutical corporations do not stop by intra-regional coordination. Globally dispersed production and sales organizations, inevitably leads to more open demands for inter-regional coordination, including efforts to achieve global sourcing.

When the merger between LKB and Pharmacia BTG is announced in late 1986 and initiated in 1987, all open and signs of efforts in both organizations to regionalize or create more efficient and effective international sales and marketing organizations come to a stop. Attention is drawn to the horizontal merger between local subsidiaries in the almost completely overlapping, international subsidiary nets of LKB and Pharmacia BTG.

ACCUMULATING PROBLEMS OF EFFICIENCY IN THE NEW BIOTECHNOLOGY GROUP

After a number of changes on top and intermediate management levels in the new Pharmacia LKB Biotechnology organization 1986-89, a new managing director for the biotechnology group is appointed in the fall of 1989, supported also by a team of consultants helping Procordia in the merger process between Kabi and Pharmacia. During the year that the new, externally recruited, managing director stays with BTG, a number of radical change projects are started in the organization. In contrast to former, mainly R&D oriented, internally recruited BTG managers, the new manager has experience from working in more "traditional" industrial companies.

From this perspective, the new manager has reason to question and criticize many of the emerging routines, policies and organizational structures in the new organization. After a number of analyses of the market situation and of the BTG organization in September and

October 1989, a large number of local, central and company-wide change projects are outlined and started. Despite the need for radical changes, it turns out to be a not entirely unproblematic strategy. There is simply not enough time and not sufficient resources to fully carry through all the outlined, necessary changes. Prolonged planning procedures, revisions and delays come to characterize the processes. However, many of the initiated change processes remain and later become institutionalized, also after the new CEO leaves BTG in August 1990.

The new managing director appointed in 1989 takes on the task to reform the whole biotech group by initially spending November and December of 1989 to discuss with divisional managers and inform people in the different divisions of the significant changes that are necessary. The tempo is high. The first tentative project groups are formed in December, and a number of change areas are defined and chosen. Project groups are started for looking over and changing: physical distribution and capital management, the product portfolio, product and production quality (the so-called ISO 9000 recommendations are an important driving force), production system structures, administration routines (related e.g. to the installation of integrated computer based information systems), marketing (mainly concerning the coming launches of new product systems), and the global marketing organization structure (focusing on USA and Europe). Project groups are formed and for each project group is appointed a control group, with the responsibility for the control and supervision of the proceeding work in each group. The new managing director takes a position in all control groups.

There are obvious overlaps between the projects. The general lack of internal operational efficiency and inefficient use of organizational resources is the common denominator of and link between the different projects. The distribution project becomes strongly connected to the results of the product portfolio analysis, and the distribution changes are also interlinked with the changes to reorganize the global net of the marketing organization. A central theme in the new manager's presentations of the projects and of the new urgent priorities in the company is the need for improved communication, coordination and cooperation between different units within the organization. It is above all improvements in the communication between the central organizational units and the marketing units abroad that shall be given priority:³⁴

The communication with the subsidiaries must be improved. Everyone who in one way or another performs activities directed to the subsidiaries must intensify the contacts.....The general understanding of the subsidiaries' conditions must be improved.....

³⁴BTG Executive Manager, information meeting with employees in the Bromma organization, 22 November 1989, transl.

He is worried about the fact that many of the central units have lost some of their contacts with the market, including both customers and subsidiaries. After the first weeks of analyzing the company, he says that he has become aware of "inertia that is so strongly embedded in the company" and the information flow has to be improved in order to change this situation:³⁵

This is needed if each and everyone shall be able to influence our quality, distribution ability and services. This is where our most acute problems lie.

Towards the end of 1989, and prior to the formulation of a regionalization program for the local subsidiaries, one of the most important local changes is initiated by the newly appointed BTG manager. Analyzing the large US organization, he questions the size and organization of the US operations, centrally in Piscataway as well as regarding the way the local marketing offices are built up. The organization had expanded during the preceding good years when sales had increased easily by 15-20% a year, a problem which many of the BTG subsidiaries had in common. The US market is by far the single most important and it is necessary to implement two important change processes in order not to lose market shares on this important market. Firstly, the central support organization for BTG in New Jersey needs to be reduced. In 1989, around 130 people have to leave the US subsidiary organization. Concurrently, the local US marketing units are regionalized and divided up in six sales regions. They are later reduced to three. Subsequently, as the global so-called Regionalization Program takes off in 1991-92, the US sales regions are connected to the Canadian sales organization, forming a semi-integrated North American sales region.

Analyses made in 1990 of the organizational structures and operational efficiency in the other two major regions, Europe, Japan, and the rest of Far East, show similar problems, but are in other respects quite different from the more homogeneous US organization and its market conditions. Analyses of the European organizations indicate two major problems. Firstly, during the course of the 70s and the 80s, and accentuated by the mergers and fusion processes, a high degree of heterogeneity has been allowed to develop. The wide variety of internal routines and resources, and organizational and management structures have created problems of developing efficient exchange routines between the subsidiaries and central HQ units. It has become difficult for the Uppsala units to be informed about and control the activities of this diverse, heterogeneous set of local organizations. Secondly, analyses indicate that the independency of most European subsidiaries also hides internal inefficiencies; the organizations have many organizational levels, inefficient management structures and an overflow of administrative resources.

³⁵BTG Executive Manager, information meeting with employees in the Bromma unit, December 1989

For the Far East organizations, analyses indicate what has always been a known fact; the importance of the Japanese organization and the large differences in market and marketing conditions compared to the other Asian units, motivate a separate handling of the Japanese subsidiary. It is a matter of developing efficient routines for handling the contacts with local distributors combined with efforts to improve the sales routines of BTG's own, local sales and support units. For the other Asian sales organizations and subsidiaries, analyses indicate a need to decide the future role of the central support organization in Hong Kong, and of local subsidiaries - e.g the important Australian and Indian organizations - and of the sales offices in the heterogeneous Asian region.

Analyses show that intra-regional changes need to precede any attempt to improve inter-regional coordination. The start with the North American region, needs to be followed by a radical change of the European region, and lastly the Pacific/Far East region and Japan. Despite signs of an increased "globalization" of certain customers' purchasing, product development and production activities, this fact is overshadowed by the needs to improve intra-regional efficiency, and is by far most important concerning Europe. Local administration costs and resources have grown out of proportion and must be reduced, according to analyses. At the same time, marketing activities need to be decentralized to the local organizations, combined with a reduction of the size of the large central support units in Uppsala. The idea comes up to establish a new decentralized support organization in Brussels for the local European sales organizations.

THE BIOSYSTEMS ORGANIZATION BEGINS TO TAKE SHAPE.....

The ideas to rationalize and regionalize the central and local sales and marketing organizations for the different biotech operations - the laboratory separation, process scale and molecular biology operations - begin to take shape in 1990. A planning group discusses the needs to make radical rationalizations in the marketing and sales organization. In December 1990 the idea to set up a European organization in Brussels is officially presented for the first time and intensified discussions are started in January 1991. In the LKB merger, and coupled with the recession and levelling of sales after 1989, both the central and the local marketing organizations have become over-dimensionalized. In the ongoing, tough rationalization program, radical steps have already been taken to cut costs in R&D and production organizations, resulting in the decision to close down LKB's Bromma operations. Despite this, and the start of similar reductions in personnel in the central marketing support divisions in Uppsala, little time

has been devoted to look over the total, global marketing organization for the biotech operations.

From the internal discussions on the need for rationalizations and decentralization of the marketing operations emerges the idea to take the reorganization by regions. The organizational differences between the three main sales regions - Europe, North America and Japan - are obvious. The Far East region with its dispersed sales organizations also differs considerably from the other three. To meet the different requirements, specific traditions and organizational specificities of each of the four regions, and to meet the needs for a decentralization of marketing responsibilities, a regionalization of the global marketing organization is suggested, during the autumn 1990. A regional organization with responsibility for the sales and marketing operations in the whole region shall be established in each of the four regions. Local resources, mainly administration and support for local sales personnel, shall be reduced or transferred to a new regional unit. Although not openly presented from the start, the idea emerges to transform local subsidiaries to sales units with minimal administration. Concurrently, central marketing support in Uppsala shall be reduced considerably, with some of the resources moved to the regional organization. The most radical changes will have to be made in the European region, with its large number of powerful market subsidiaries.

The discussions on a regionalization and reorganization of the biotech sales operations continue throughout 1990. Meanwhile, the pre-merger plans resulting from the Volvo-Procordia deal continue in January-June. The formal decision to establish the new holding company Biosystems in June 1990 does not interrupt the discussion concerning a regionalization. During the fall 1990, the planning for a Biosystems organizations and for the new biotech sales regions continue, but in different parts and on different organizational levels in the new giant Procordia Group.

In January 1991, the plans for a regionalization program for Pharmacia LKB Biotechnology are presented to the executive management for Pharmacia Biosystems. From the very beginning, when the merger discussions had started between Kabi and Pharmacia it had been stated that two separate organizations for the pharmaceutical units and for Biosystems. Within Biosystems, however, the BTG management had early been given the task to start discussion on their own on how to structure the future marketing operations. Later, tensions emerge when the Biosystems management adopts the elaborate BTG solution. The solution is being considered so good that it should be implemented on the whole Biosystems group.

A small, central holding company management group for Biosystems is formed and Pharmacia Biosystems is formally established. The BTG group finds itself in the middle of two structural change processes. On the one hand, the new Procordia organization offers an opportunity for regionalization of the biotech sales organizations by speeding of the decoupling from the pharmaceutical Kabi-Pharmacia sales units abroad and in Sweden. On the other hand, the same organizational change draws BTG closer together with the other organizations of the new Biosystems Group. In the internal discussions in January 1991, the new Biosystems management unit approves of the regionalization plans. However, an important prerequisite for a start is that the regionalization is adapted to comprise also the other companies of Pharmacia Biosystems.

The decision puts a stop to the regionalization project. That is, the rationalization process that is already affecting the North American organizations continue with minor adaptations, but the more radical changes that have been planned for the European region have to be revised. During the months that follow, the contents of the plans have to be adapted to the new, emerging Biosystems organization with its diverse set of organizations, products and customers. In Brussels, Procordia's already established unit for EC activities, Procordia Eurocentre, is complemented with staff from a number of BTG's subsidiaries in Europe, to form Pharmacia Biosystems Eurocentre. It is the first step towards the formation of an intermediate, regional office and organization for Europe.

On May 2, 1991, the Pharmacia Biosystems Board presents the five new operating companies of the Biosystems Group: Pharmacia Process Separation, Pharmacia Laboratory Systems (Separation Products, Molecular Biology Systems and Biochrom), Pharmacia Molecular Biology (Pharmacia P-L Biochemicals), Pharmacia Diagnostics, and Pharmacia Deltec. Wallac, Kabi Diagnostics and Pharmacia Biosensor are to report directly as Product Divisions. The process to phase out the diagnostic, blood virus operations conducted by the US company Pharmacia Diagnostics Inc. (including former ENI) is started. The same applies to the process of selling out Sebia S.A. in France.

In the same announcement, a first coming step in the revised plans to reorganize the international sales and marketing organizations, is described. In order to achieve a structural development which links the new Biosystems companies closer to the customers, two regional companies have been decided on: Pharmacia Biosystems Region Europe and Pharmacia Biosystems Region North America.

The two companies are to operate parent organizations for the local marketing companies. It is stated that certain region-wide marketing functions will be centralized to the regional companies from local entities in order to strengthen market positions. Concurrently, other marketing functions will be decentralized and transferred from the operating product companies to the regions. Sales activities and most customer contacts will remain with the local organizations in each country.

It is also decided that Region Europe will include all European sales and marketing operations for all Pharmacia Biosystems' products. Region North America will cover the US and Canada for all products except those of Pharmacia Deltec, which is in the process of building up a global sales organization controlled from St Paul in USA. To prepare the launching of Pharmacia Deltec's products on a broader scale in Europe, a special Medical Director is appointed for Europe, and is placed with Pharmacia Biosystem's German organization in Freiburg. The situation for Pharmacia Molecular Biology, i.e. the US based Pharmacia P-L Biochemicals organization, should be further developed; the emerging market growth should be utilized and the business be expanded. Furthermore, it is decided that the locations for the Regional organizations shall be Brussels and Piscataway. A newly appointed President of the European office will in the interim also have the responsibility for the build-up of a new Kabi-Pharmacia operation in Italy. The President of the American office is also to retain a position as President for Procordia U.S. Inc., the corporation's new holding company in USA.

It is stated that, initially, marketing companies outside the two regions will continue to report as usual, i.e. to the operating companies, but as part of the regionalization a re-organization of the reporting routines etc. will have to be implemented in the near future. There are no immediate official plans to regionalize, in the same way, the sales and marketing organizations outside the European and North American Regions.

Despite the fact that much attention is directed to Europe, rumours of internal discussions in the central Biosystems organization concerning a shift in "balance" between the European and the American Biosystems organization reach the operating companies. Ideas come up to move important, Biosystems common, business development activities to the American organization. Two of the five operating companies - Deltec and P-L Biochemicals - are in fact American. It is also a fact that in both biotechnology/molecular biology and medical devices, most technological advances originate in U.S. based research. In diagnostics, European and American research have more equal positions. The idea to transfer R&D resources and some of the power of the European - mainly

Sweden based - Biosystems organization to the new North American Biosystems organization in Piscataway is never implemented.

SUMMER 1991: STRATEGIC PLANS FOR A REGIONALIZATION AND A NEW DIVISION OF WORK

At a strategic planning meeting in June 1991 a more detailed plan for a possible regionalization of the global marketing organization is discussed, encompassing ideas both about the contents of a future reshuffling of activities and functions, and about the process by which this change can be achieved. Analyses of the situation has defined three important, underlying change processes and driving forces; the rapid regionalization of the customer base leaving behind the old country based division of customers, an increasing need for proximity to the customer, and lastly, the fact that regional integration is seen to occur faster than global integration. The strategic consequences of this for the next three years, 1991-1993, are that there is an urgent need for decentralization and delegation of marketing responsibilities, there is a need for regionalization with central coordination, and lastly, globalization shall be achieved through regional integration.

At the strategic marketing meeting in one of the three divisions, Pharmacia LKB Biotechnology,³⁶ in June 1991, it is also acknowledged that a successful regionalization will depend on a major change in the biotech companies' corporate culture. The internal analysis describes and pinpoints the problems of the company's established international marketing orientation:³⁷

Pharmacia has essentially been a strongly centralized company with a parochial approach to both regionalization and globalization. Previously, being international has meant that we have had sales activities in a large number of countries not that we have been a fully integrated multinational company. Our ambition must be to achieve genuine global integration through coordinated decentralization and an understood regional sharing of responsibility.

The tentative discussions on a new organizational structure suggest a new structure with 1) a Central Division with strategic business areas and product profit responsibility, 2) Regions (North America, Europe, and Asia Pacific are suggested) with strategic and tactical marketing units, and 3) Sub-regional sales offices. The discussions focus heavily on the major change in the role of the Central Division and of the Region/Subsidiary, i.e. the first interorganizational relation in the new structure. The connections within the Regions between the new central regional organization and the local sales organizations,

³⁶The organizational situations in the Process Division and in the Molecular Biology Division are somewhat different and their management groups in Uppsala and Milwaukee are not included in the strategic discussions described.

³⁷Strategic Plan, Pharmacia LKB Biotechnology, 12 June 1991

and between the latter and the customers are devoted less attention at the initial planning stage.

According to the new, hypothetical, organization model, the Central Division (basically the central, present headquarter organizations in Uppsala and USA) shall increase its responsibility for long-term business orientation and product life-cycle management, and its role in steering and coordination. The hypothetical Regions, on the other hand, shall have responsibility for short- and medium-term strategic and tactical marketing, including market segmentation.

The problems of implementing the new division of work are acknowledged:³⁸

If the planned changes in the Central role were immediately implemented there would be an impossible burden on regions.

Weaknesses in the regions rather than in the central divisions are according to the planning group important reasons for this, related for example to the already acknowledged weaknesses in local financial steering and profit optimization for products and markets, the use of effective marketing techniques and little experience in handling demands of intercultural marketing and business. The consequence of this for the implementation process is that:³⁹

A combined and coordinated effort must minimize these weaknesses.

Simultaneously, the internal discussions and plans acknowledge that:⁴⁰

The task in front of us is not trivial and there is a need for rapid implementation and change.

The rapid decentralization must, according to the analysis, be coordinated between regions, while concurrently allow time for acquiring expertise in the Regions on strategic management. The change process shall permit smooth transfer of responsibility from the Center, and occur at the same time as major changes in product and marketing mixes for a large number of products is implemented, including the ongoing changes and collective responsibility for implementation of standards complying with ISO 9000. To increase the opportunities for an efficient and effective organizational transition, two new management groups are formed: a Strategic Management Group which focuses on decisions related to long-term directions for R&D, product care, marketing, international coordination issues

³⁸Ibid

³⁹Ibid

⁴⁰Ibid

(e.g. pricing) and acquisitions/divestments, and an Operational Management Group in which the Regions are represented and will meet approximately four times a year. The planning group also suggests that clarity concerning terminologies, job expectations and division of responsibilities will now be key factors for success.

The acknowledgement of the processual problems expected to meet the organization when entering on the path of regionalization is complemented with an extensive and very detailed list describing a general, new division of responsibilities between Central Divisions and Regions. The list of division of key responsibilities and functions suggested contains eight main points for each organizational level:

Central Division responsibilities: product management, product profit, product administration, product marketing concepts, strategic business planning, knowledge management, product development and interregional coordination.

Regional responsibilities: market segment management, segment profit, strategic segment marketing, tactical marketing, direct marketing, trend assessment/forecasting, distribution channels and key account management.

While the general plans are to transfer most of the product management responsibility to the Central Divisions and the marketing management responsibility to the Regions, it is recognized that the degree of possible regionalization, i.e decentralization of marketing and product responsibilities, will be dependent on product types and product areas. While the newly developed SMART System will still require a high degree of centralized support, it is estimated that marketing and some product responsibilities for other, more simple and mature products like consumables and the FPLC instruments, can probably be decentralized much faster. The new decentralization of marketing responsibilities will have to be coupled to a sometimes radical reformulation of the present central divisions' functions. Four key roles are discussed: planning (strategic, tactical. forecasting), information management (seeking, evaluating, competitor analysis), coordination (all functions which have impact on the product) and control (price, cost, profit, phasing out old products, new products).

A long, detailed list is made, describing a potential region/center job definition for 70 different marketing activities. It denotes the primary responsibility and the secondary responsibility for each activity, divided up between Region and Center. Preceding the detailed list, the general contents of a new Central/Regional marketing interface is summed up:

Central Marketing

*Product support on a continuous basis *Input and interface with R&D *Technology/know-how transfer to regions *Market research on a global basis for new areas *Coordination and synthesis of regional market research efforts *Consolidated competitor intelligence *Internal training on new products/areas *Answering regional customer technical questions *Technical data sheet production *Coordination(world-wide) of application note production *Development of core building blocks to be used on promotional material *Product administration(prognosis, logistics contingencies etc.) *Application emphasis on new products/areas, retain critical mass

Regional Marketing

*Development and implementation of regional marketing strategies *Development and implementation of regional pricing strategies *Competitor intelligence, pricing *Planning and budgeting for product range, forecasting * Development of core promotional material for region *Market research on a regional basis for existing products, covering both existing and new market segments *Training of regional representatives and customers on existing products *Development of training packages for the region *Development and implementation of regional communication strategy *Promotion material based on central "blocks"; local adaptations of promotional material in subregions *Execution of direct marketing activities *Regional OEM and distribution arrangements *Applications emphasis on existing products.(Ibid)

The regionalization program as now discussed is for the rest of 1991 and during 1992 to focus attention to the European organization. Changes in other key areas are to be performed concurrently. Within the central management group of Pharmacia LKB Biotechnology, four other strategic key areas are defined: capital management and distribution, after sales support, the review of the established but problematic product area of electrophoresis, and the new important area connected to molecular biology systems. Other ongoing change projects shall continue as planned, for example, the quality improvement programs.

FALL 1991: A NEW BRUSSELS OFFICE, SUB-REGIONALIZATION AND RE-SHUFFLING OF INTERNAL RESOURCES

The first step after the new start in the summer 1991 is to build up an intermediate organization for Pharmacia Biosystems Europe in Brussels. The Brussels based project group encounters a number of practical problems, most of which are related to the recruitment process. It is a matter of finding the right - internally recruited - people to the new positions in the intermediate regional organization, without upsetting too radically existing structures of power and control distributions. People are recruited both from the central Uppsala organization and from the European subsidiaries. There are concerns in the project group that subsidiary management groups will regard the change and the new intermediate organization as a threat which will enhance the uncertainty that already exist about the future structure and operations. The recruitment process in late 1991 is also followed by uncertainties in the new Brussels unit concerning the division of work: What activities are to be controlled by the product companies in Uppsala and elsewhere and what is to be under the control of the new intermediate, regional organizations? This, together with the reduction of activities in the subsidiaries, creates problems. During the

fall of 1991 and the spring of 1992 there is considerable confusion and uneasiness in the European subsidiary organizations concerning the future role of the local organizations. It is clear, however, that the organizations and much of the local power are to be transferred to the new regional office in Brussels. The question is how large the remaining organizations will be. During the recruitment process to establish Biosystems Europe in Brussels, it becomes clear that the reshuffling of management capacity between the subsidiaries, the Brussels organization and the central product companies will be one of the major obstacles to create a new vertical organization structure. An idea emerges to take the regionalization in steps, beginning the process of establishing pan-European coordination by creating sub-regions.

The process of establishing sub-regions in Europe is driven by several factors. The changing power distribution and the reshuffling of management in the subsidiaries, in Brussels and in the central support organizations create internal problems. Which of the local managers have the capability to become central managers in Brussels? Which managers will be satisfied with a position as local sales or marketing managers? Which managers need to leave the organization? Later, the management problem of power distribution is accentuated as it becomes clear that the diagnostics and the biotech supply operations are to be separated - towards the end of 1991 Biosystems as an operational group is being questioned. Many of the local subsidiary managers have had the responsibility for both operations. The organizational separation leaves some of the subsidiary managers with the control over only the biotech units. A partial solution to the problem is the introduction of sub-regions. The creation of sub-regions also becomes a step in the ongoing process of reducing the internal resources for sales, marketing, distribution and administration. Hence, the process is helped by the already ongoing reduction of local distribution resources within the capital rationalization program.

The process of establishing sub-regions in Europe takes off during the fall of 1991. The process is under the control of the new emerging Brussels organization. Language and geography are important factors for dividing the region. In addition, the size of the subsidiaries and the maturity and stage in the ongoing processes of change also influence the planning for and implementation of sub-regionalization. When the process continues in January 1992, the new regions and the new internal, contacts and coordination between the local organizations are founded on the following specific division.

The Nordic countries Sweden, Denmark, Norway and Finland form a Northern sub-region. The management responsibility is given to the manager of the newly established, and the largest, subsidiary, the biotech supply market organization in Sweden.

The close geographical distance between the United Kingdom and the Benelux countries motivates the creation of a Northwestern sub-region. The former subsidiary manager of the British organization leaves the organization. In the Benelux units, the sub-regionalization emerges concurrently with the process of rationalization of sales, marketing and distribution resources in the region, and with the process of establishing Pharmacia Biosystems in Brussels. There are discussion whether to use common or separate sales and marketing resources for the three countries. In spring 1991, there is one marketing director for Pharmacia Diagnostics, Wallac, Sebia and Kabi Diagnostica in the Benelux region, but national sales units in each country within the region.

When a Latin sub-region is planned, it is obvious that the size and the particularities of the French subsidiary necessitate a separation of the French from the Italian, Spanish and Portuguese organizations. The large, and as regards biotech supply operations still developing, French subsidiary organization cannot be compared with the still relatively small and young organizations in the three latter, and for Pharmacia, recent expansion areas. The internal, complex organizational structure of the French organization, its particular information and administration systems and its intertwined contacts between the diagnostics and biotech supply units motivate a separate and specialized treatment of the subsidiary in France. It is decided to wait before making any changes to the French organization.

For the German speaking region, a central sub-region is formed from the former German, Swiss and Austrian subsidiaries. It is acknowledged from the planning stage in late 1991 that one of the problems that would most likely appear if not handled properly concerns the dominance of the German organization. In order not to lose management and sales personnel in the integration process in Switzerland and Austria, it is necessary to attend to a balanced division of management power.

Lastly, for Greece, the Middle East, Africa and for some of the Eastern Bloc countries, plans for a new Export Region are outlined with offices in Athens and Vienna, and with sales subsidiaries e.g. in Hungary, Yugoslavia and Russia. The particular market conditions and customer contacts in the Middle East and in Eastern Europe motivate Pharmacia to sell off parts of the business to the manager in Athens. In practice, this will mean that the organization will become a contracted distributor, representing Pharmacia in the Middle East. According to the plans, the biotech supply organization shall maintain the control over marketing activities in the unstable but important markets in Eastern Europe, including parts of the former Soviet Union.

The troublesome process of establishing a Biosystems organization in Brussels overlaps with and confuses the ongoing regionalization and rationalization processes of the European sales organization. After the summer holidays, in August 1991, the newly appointed Biosystems executive manager announces that he will leave the organization. During the spring 1991, a number of organizational changes in Brussels have been the first steps in the introduction of a regionalized Biosystems support organization. A manager for the new Pharmacia Biosystems Eurocentre has been appointed. In addition, the process of integrating sales for Holland, Belgium and Luxemburg in the nearby Benelux region has been started, resulting e.g in the appointment of a marketing executive for Pharmacia Diagnostics, Wallace, Sebia and Kabi Diagnostica for Benelux, positioned in Brussels. The process of legitimizing and stabilizing the new marketing support organization is hampered by the resignation of the newly appointed Biosystems executive manager. Did the executive management in Uppsala and did the Procordia management strongly believe in the idea of Biosystems? If not, what effects would it have had on the idea of a regionalized market organization? The take-off of the sub-regionalization program in January 1992, coincides with the emerging awareness that a functioning Biosystems organization will never be implemented. The regionalization and sub-regionalization processes in Europe do not evolve as planned. It is obvious that a number of reformulations will need to be made in 1992...

DISMANTLING OF BIOSYSTEMS AND NEW AMBIGUITIES

Two interlinked events announced in January 1992 disturb the ongoing processes of re-organizing the international marketing and sales organizations. Firstly, Procordia and Volvo announce their plans for a merger. The process is to begin with Procordia offering to buy all shares in Volvo, which will give its name to the new combine. The merger of Volvo and Procordia will combine Procordia's cash generating food business and expanding pharmaceutical sector - both distinguished by their low cyclical vulnerability - with a substantial vehicle manufacturing concern. However, the process does not develop as planned and the first half of 1992 is devoted to intense contacts with the new government. The deal and the proposed merger cause concern, clashing with the government's proposal to sell its shares in Procordia. Eventually, Procordia's bid is withdrawn and in mid 1992 Volvo and the Swedish government conclude a new agreement governing their respective shareholdings in Procordia. Much time and resources are devoted to the process, resulting in ambiguities concerning the future structure of the Procordia conglomerate.

Secondly, at another level in the organization, Procordia announces its new internal organizational structure as of February 1992. Procordia's two business units in Health Care (Kabi Pharmacia and Pharmacia Biosystems), the eight Food companies and the two Service companies are to be slimmed down to six business units. An important underlying driving force is the radical, continued growth and need to expand the pharmaceutical business of Kabi Pharmacia. Pharmacia Deltec in USA and Pharmacia Diagnostics in Uppsala are transferred to Kabi Pharmacia. As one of the six new business units a new business area, Procordia Invest, is created. The outspoken intention is to develop, give added value to, and realize the growth in values of areas which have no clear synergies with the Group's core areas. To this group is transferred, among others, Wallac from Pharmacia Biosystems. Another Biosystems venture, the Biosensor organization, is now to report directly to the Procordia management group as a business project. The former Pharmacia Biosystems group is dissolved and the three remaining organizational units - Pharmacia LKB Biotechnology, Pharmacia BioProcess Technology and Pharmacia P-L Biochemicals form the separate biotech supply company, Pharmacia Biotech.

Meanwhile, as a "new", self-contained biotech supply company is emerging, the international re-organization processes take new routes. A new manager for Pharmacia Biotech Europe is appointed in February 1992 to take over, continue and in parts reformulate the process of establishing a new, slimmed marketing and sales organization for Europe. The Brussels based manager takes over a both diffuse and much more simple organization. The Biosystems organization for Europe has been dissolved. The contacts with the diagnostics units, including Wallac which is put in the pipeline for sale, are formally dissolved, while local contacts and common administrative and service resources remain in some of the local organizations. While Wallac is slowly being uncoupled, the other former LKB organization, Biochrom, is back in business, as the decision is taken to keep the business operations and integrate them with those of Pharmacia LKB Biotechnology. In this new situation, there is an increasing need to break the inertia and general lack of progress in the regionalization process. New efforts are directed at the sub-regionalization, and the continued slimming and rationalization of the sales, marketing, distribution and administration resources in Europe.

In the continuous reshuffling of internal marketing and sales resources during the spring and summer of 1992, there emerge ambiguities concerning the future roles and functions of the central Uppsala marketing units, the new Brussels organization and the remaining local subsidiary units. Around 100 people have to leave the central support organization for biotech administration and marketing activities during the spring. The same type of

rationalization of marketing, sales, distribution and administration takes place in the subsidiaries. Concurrently, around 25 people begin to form the new regional support organization for Pharmacia Biotech in Europe. Around 20 of these are recruited from the local sales units. The uncertainty that emerges concerning the roles and functions of the central product companies, the regional organization and the local units of the sub-regions grows. The ambiguities concern the relationship between Uppsala and Brussels, between Brussels and the sub-regions, between the subsidiaries in the sub-regions, and the future contacts with the customers. In the former case, there is a growing concern that the marketing support is not decentralized enough. Brussels and Uppsala are both handling important marketing support activities which according to plans shall be decentralized to Brussels. Concurrently, the centralization of administrative and marketing activities from local subsidiaries to Brussels increases speed. However, during the course of 1992 it is realized that the plans made are not sufficient and far reaching enough. New plans need to be developed.

The sub-regionalization process continues, but takes somewhat new routes - the Brussels organization needs to change some of the original plans. In the Nordic region, the process of coordinating the four countries develops without any major problems. The same applies to the central, German region. Successively, most of the administrative resources are transferred from the Swiss and the Austrian companies to the German company in Freiburg. The marketing support activities can be centralized and handled by one unit for the whole region. In order to balance the division of management resources in the sub-region, the Swiss service manager is appointed sub-regional manager for the local technical service units in the three companies. As an intermediate step in the distribution change program (all stocks are eventually to be taken back to Uppsala), stocks and distribution resources for the central region are transferred to the German organization. With some minor exceptions, sales personnel remain unchanged in the three companies.

As for the other sub-regions, some minor changes have to be made. The UK organization is separated from the Benelux units in the Northwestern sub-region towards 1993. The regional manager for Europe is able to recruit a local UK sales manager who proves to be able to manage the UK business in a more self-reliant way. Meanwhile, the regional manager is appointed Vice President of Sales for Europe, without replacement as the UK and Benelux begin to function as separate organizations but still reporting to him in his new position.

The Latin region will be kept as a region until the end of 1993. Due to misuse of his management position, the regional manager has to leave the organization; before this the

idea of a Latin region is not questioned. Due to this incident and to the need to develop and concentrate the build-up of the Italian market, the Italian organization is separated from Spain and Portugal in the Latin sub-region. Later, two new managers are appointed.

Despite the potential inherent in the increased coordination between units in each sub-region, this is not the major task as the regionalization program continues during the summer of 1992. An internal analysis of the project points to several problems linked to the vertical contacts between local, regional and central units: the division-of-work is still unclear, offices and resources in some local organizations are still shared by Pharmacia Biotech and Kabi Pharmacia, the change process develops too slowly and the thought emerges that the regionalization and coupled rationalization program need to be taken much further. This results in the new idea to transform the former subsidiary organizations into local sales offices...

1992: THE REGIONALIZATION PROJECT IS GIVEN A NEW CHANCE

During the budget process in Pharmacia Biotech's regional organization in Brussels in the fall of 1992 - in a situation of organizational and process ambiguities and lack of results concerning cost reductions - plans emerge for a reformulation and a new start for the regionalization program. In the discussions between the newly formed Pharmacia Biotech management group in Uppsala and Pharmacia Biotech Europe in Brussels, the latter is given two years to implement the new organization plan.

The new, revised plans entail a thorough analysis of the present and the future resource structure for the European marketing organization. The plans encompass a radical reduction of scope and manning of the local organizational units. The former, powerful subsidiary organizations which have been built up in Europe since the late 50s, are according to the new plans to be reorganized and reduced to local sales branches with minimal local administration. Remaining sales and service personnel are to concentrate on the customer contacts. The underlying analysis points to the need to focus attention to the customers. The local organizations shall be adapted to the need to differentiate more clearly between key accounts and other customers.

When the regionalization and sub-regionalization process enters a new planning and implementation phase during the latter half of 1992, the need for a continuous feed-back from the local units results in the appointment of a Marketing Area Manager for each of the sub-regions. These are to be link-pins between Brussels and the local organizations/sub-regions. They belong to one of the organizations of each sub-region

and become responsible for reporting back to Brussels about local marketing and organizational activities, and also for implementing European marketing strategies formulated by the Brussels organization.

The new start for the regionalization program overlaps with a number of other, ongoing and newly started, change projects. The rationalization and reduction of the local and the central Uppsala units coincide with the already ongoing capital rationalization and distribution project. The new start is coupled with the next step in this distribution project, the discontinuation of all local stocks and a centralization of the stocks to the Sweden based warehouse and production units. In addition, aimed for the administrative cost control routines, the process to standardize EDI systems, including both hardware and software, takes off. The process needs to be taken through different stages, adapted to the great variety of internal systems that has been allowed to be established over the years. The standardization problem is one of the reasons to wait with any radical reorganization of the French subsidiary. Another important project is focused on quality improvements, adapting both central and local organizations to the so-called ISO 9000 standards. The late 1992 signals the start of a new, intensified period of change in the "new", Pharmacia Biotech.

REMAINING LINKS TO FORMER BIOSYSTEMS COMPANIES

One important consequence of the dissolution of Biosystems, the reorganization of Procordia and the abandonment of the plans for a Procordia-Volvo merger during the first half of 1992 is an increased independence of the biotech supply companies from the other operations of Procordia Health Care. Although some of the processes of the regionalization program in Europe have propelled the responsible Brussels-based group along some of the planned lines, the former organizational ambiguity has contributed to the inertia and slow rate of change. The new, relative independence of Pharmacia Biotech improves the opportunities to speed up the process, while simultaneously putting the biotech supply company in a new situation; the pressure on the company to show improved profitability increases.

In this new situation of organizational clarity, some of the links to non-biotech companies in the former Biosystems Group remain, but are changing. The unclear situation for the former LKB subsidiary for immunodiagnostics and analytical systems, Wallac, is successively changing as the company is transferred to the new Procordia Invest. The successive concentration in the diagnostics area to allergy diagnostics is accentuated as the idea to sell the company takes shape. As a result, in February 1992 a preliminary

agreement is signed with a US, Boston based, company, EG&G, whereby the latter will buy Wallac Oy from Procordia. Negotiations on a definitive agreement continue throughout the year. The instruments of Wallac have by tradition, since the LKB-Pharmacia merger, been sold by a mixture of specialized and non-specialized sales personnel under the formal control of Pharmacia LKB Biotechnology and Pharmacia Diagnostics. Since the merger, the turbulence in Pharmacia has resulted in the transfer of responsibilities back and forth between Uppsala and the mother organization in Turku. The prolonged negotiation process leaves both Wallac and Pharmacia Biotech in a vacuum. Wallac sales continue, in Scandinavia, United Kingdom and USA through its own Wallac subsidiary units and in the smaller markets with the help of Pharmacia Biotech and Pharmacia Diagnostics marketing resources. Pharmacia Biotech continues to represent Wallac in France, for example, but plans for a separation of sales resources begin to take shape.

The connections between Pharmacia Biotech's new European marketing organization and the Uppsala based company Biosensor also change. During the course of the regionalization process, Biosensor takes the next steps to establish its own, specialized marketing channels, while having to rely heavily during the course of this process on the sales resources of Pharmacia Biotech. Biosensor and Pharmacia Biotech sign distribution contracts for those local markets where Biosensor has not yet established its own sales forces: the Nordic countries, Benelux and Italy. Pharmacia Biotech takes the responsibility for sales, but leaves most of the qualified services, application support and demonstrations to the central Biosensor organization. In the U.K., France and Germany (covering also Switzerland and Austria) Biosensor has successively built up its own sales organizations. Despite the strong connections to Pharmacia LKB Biotechnology's laboratory sales - and sometimes a total laboratory customer overlap with Biosensor - the sales of the new biosensor instruments are to be handled by a separate Biosensor sales organization. This in order for Biosensor to become more independent during its turn around and market orientation process. There are also internal political reasons motivating a separation of the sales resources. Most of Biosensor's personnel are recruited from Pharmacia Biotech. In those countries where distribution contracts are signed, Pharmacia Biotech therefore chooses to specialize single salesmen for the task, supported heavily by Biosensor's Uppsala organization. The future relationship between Pharmacia Biotech and Biosensor remains unclear.

The process of separating the biotech operations and resources from those of the diagnostics units gains speed after the dissolution of Biosystems. Towards the end of 1992, it is only in France (through Wallac) and in the Export Region controlled from

Athens, that Pharmacia Biotech still represents Pharmacia Diagnostics. The final separation of the diagnostics and the biotech operations and resources seem to be propelled along predetermined lines, partly driven by the new integration of the diagnostics activities in the new Kabi Pharmacia organization as of 1992.

In those cases where no, or minor, connections to Pharmacia Biotech's marketing and distribution organizations have existed within the Biosystems Group (e.g Pharmacia Deltec, ENI, Sebia) the dissolution of Biosystems does not lead to any major, complicating separation problems.

A RADICAL BREAK WITH ESTABLISHED MARKETING TRADITIONS: A COMPREHENSIVE ANALYSIS OF THE CUSTOMERS

A customer analysis made in 1990-1991 together with an external consultant, for deciding on a completely new distribution structure in Europe, is seen as a natural given part of the processes of "industrializing" Pharmacia's biotech supply operations, but is in fact a radical break with the established traditions.⁴¹ This and other subsequent customer analyses made are the first detailed and comprehensive analyses in the history of the company, and are the first customer analyses to reach the central management groups in Uppsala for use as a platform for redirecting the organization and the operations of the company.

The customer analyses that lay the foundations for a turnaround of the Biosystems group of companies, later only Pharmacia Biotech, give an ambiguous picture of the customer contacts which have been established over the years. While the start of the separation product business in the late 50s and in the early 60s is being based to a large extent on strong loyalty between a local representative and a local academic/research group - sometimes complemented with direct support and contacts by the small Uppsala group - the rapid growth of the organization in the 70s and 80s successively distances the central divisions from the end users. Despite strong links with academic institutions when new products and systems are developed, no formalized administrative routines are created to systematically analyse the growing range of customers. Due to market leadership, a superior reputation in purification systems, and above all, a rapidly expanding market due to the interest in biotechnology in the 70s and early 80s, the company never needs to

⁴¹Various analyses are performed in the organization around this time; During 1991, Pharmacia Biotech works with a consultant, Arthur D. Little, performing analyses related to Germany and UK, the results of which are partly tried on the whole European organization. For instance, the organizations in the various European countries are staffed based on this work. Later in 1991, another consultant, Inexa, is engaged to perform an analysis of the customer size, purchase volumes, etc.

worry about customer loyalties. There is a "general feeling" in the central divisions that customer loyalty is high, but it stems from the ability to be on the technological front-line and continuously launch new products. The company has no well-developed customer strategy.

The problems associated with understanding the effects of the LKB-BTG merger after 1986 include ambiguities concerning customers losses. Centrally, there is a vague "general feeling" that a number of established LKB customers are lost in the merger process. The first signs of a general downturn in global biotechnology and increased competition also appear, and so the loss of customers is difficult to relate to any single factor. Established customer loyalties between Pharmacia's biotech units and customers are severely challenged and disturbed by the rapidly increasing turnover in sales, marketing and management personnel in BTG after 1986. With varying exceptions in different local markets, most of the remaining customer loyalties are built either on the general, established good reputation of the whole company or on the fact that customers' investments in BTG technologies and systems are difficult to exchange.

The first comprehensive customer analyses in Europe are performed with a Biosystems perspective, and include analyses of the customers of Pharmacia LKB Biotechnology, Pharmacia BioProcess, Molecular Biology (mainly Pharmacia P-L Biochemicals), Pharmacia Diagnostics, Wallac, Pharmacia Deltec and Biosensor. The analyses reveal a number of complexities that need to be taken into account when starting on the path of changing the European organization, the distribution system and the way contacts with customers are structured and handled operationally:

Firstly, the most recent analysis of the customer situation for the period October 1990-October 1991 indicates a significant account overlap between the different companies of the Biosystems group. Many of the companies are shown by the analysis to have contacts with the same formal organizations but unfortunately the lists do not reveal whether the contacts are with the same individuals/departments or with quite different divisions within the same company. The most important questions the analysis raises concern the customer overlaps between Pharmacia LKB Biotechnology, Pharmacia BioProcess and Molecular Biology Systems/P-L Biochemicals. For example, some of the increasingly important pharmaceutical companies are found to purchase products and systems from all three. However, sometimes the industrial companies' accounts relate to divisions and organizations of the same conglomerate, but in different countries.

Secondly, the analyses indicate that the situation that has been established during the 80s has resulted in diversified customer portfolios and customer contact patterns, when the three biotech companies are compared.

Thirdly, the customer analysis also shows that relatively few products from the still broad product assortment for the three biotech companies are bought by the customers. However, there are differences between the three companies.(Table 2.4.)

	<u>Pha. LKB Bio.</u>	<u>Pha BioProc.</u>	<u>Mol.Bol.Syst.</u>
No. of customers	12 000	900	7000
Share of total sales/ 50 largest customers	15%	75%	30%
Average sales/year of most important customers	5-500 KSEK	over 500 KSEK	1-5 KSEK
Typical purchase	low frequency/ low value	high value/ varying frequency	low value/ low frequency
Typical customer order/ no of order lines	1-2	1-2	varying
Active product range/ total product range	small	small	small

Figure 2.4. Pharmacia Biotech customers, Europe

The comprehensive analysis gives no indications of the long-term stability and loyalty among the customers. The general feeling within the whole company group in the beginning of 1992, however, is that customers' former loyalty to, and stable contacts with Pharmacia Biotech - which has been based on Pharmacia Biotech's reputation for always being on the technological frontline - is changing. Competition has increased rapidly since the late 80s.

The stability and loyalty factor also depends on customer group. Pharmacia BioProcess' industrial customers are, for natural reasons due to the long-term nature of the investments in systems, generally more loyal over time. The contacts are more intense and long-term, and require the company to make adaptations and customized solutions. The academic customers, on the other hand, are generally known to be more "illoyal", shopping around among suppliers for laboratory equipment. Their purchasing behaviour is also influenced by the distribution of research grants and the purchasing routines of academic institutions, making purchases somewhat more difficult to plan and control. The general loyalty of the governmental institutions (control laboratories, etc.) and the clinical institutions (hospitals, clinical laboratories, etc.) is more difficult to determine. The

intensity and stability of the contacts with the customers also varies between product groups. The up-scaled industrial systems require more intense and long-term contacts between the company and the customer. This also applies to the technologically advanced molecular biology systems which require both educational and application services. The standardized chromatography and electrophoresis systems and consumables on a laboratory scale normally require the least intense contacts between Pharmacia Biotech and the customers.

The idea to implement a key account management system crystallizes during 1991 and is given the strong support of the Uppsala management group in the beginning of 1992. The customer analysis indicates that the new European marketing organization and the new customer oriented marketing and sales operations that are to be implemented by the Brussels organization and the subsidiaries should direct their attentions to one of the customer groups. It is time to devote and focus more attention and interest to the growing segment of molecular biology oriented industrial customers, customers who are most likely to suit the new key account management ideas....

DRIVING THE REFORMULATED REGIONALIZATION PROCESS: A NEW VIEW OF CUSTOMER RELATIONS

In January 1992, a new central strategic planning meeting is held to review ongoing processes and discuss a long range plan for 1992-1994. The Biosystems organization is being dissolved, but new organizational change problems command the attention of the strategic planning group. The meeting will result in, among other things, a more intense focus on the importance and implications of key accounts, resulting from, among other things, the observation of a long term weakening of customer image:⁴²

We can no longer rely on technology advantage and large market shares. Our competitors refer to us as "the sleeping giant" because we are not aggressive or effective, and have a low business profile. We must respect customers' demands for service and value for money.

The group is able to present both good and bad news. The good news is that financial analyses indicate that the biotech operations are beginning to stabilize financially, due to internal progress in key areas and a general achievement of most financial objectives. It is also reported that there is an improved, and increasing, general understanding within the whole organization of the importance of improved operations. At last, the company

⁴²Central Operation Strategic Direction and Structure Plan 1992-1994. Key account management had been part of the original organizational concept, based on an analysis with consultants during 1991. Some special calculations had earlier been made on the number of accounts to be covered and the resources needed in order to do that. This new analysis is made with basically the same purposes.

seems to be positioned for a genuine business turnaround. The bad news is that although there are clear signs of improvements, the speed of adaptation is too slow, cost levels are too high (despite steady improvements in capital management and distribution improvements), productivity levels are not competitive and the biotech operations are seen to be "extremely vulnerable to market changes". Three things need to be attended to: the slowness of internal change and response times, the continued general market weakness, and the weakened customer image. The radical change processes in the biotech supply operations during the preceding years have largely been the result of the short-term focus. It needs to be complemented with a more long-term perspective. The analysis points to the speed and timing dimensions of the continued turnaround:⁴³

Rapid restructuring and improvements in internal operations are needed to achieve genuine changes in efficiency and return this company to full competitiveness within the short time available...The best time to change an operation is when it has momentum and is improving. For once we will be restructuring and changing our way of working at a time when our situation is improving. The restructuring is not a panic response to a decline but rather a planned series of steps to get us out of the chronic crisis we have had for several years.

The need to speed up and improve the regionalization program, including improvements in the Central-Regional contacts and division of work, is coupled to a more open discussion of customer-related changes. Although the idea of key accounts and a differentiation of customer contacts have been appearing in plans and discussions - mainly in connection with analyses made for the distribution changes and the regionalization program - it is now more openly coming into focus for change.

Several observations trigger the increased focus on the existing customer situation. One strand of the market analysis indicates a trend towards concentration of funds in both public and private sectors with focus on a smaller number of projects, with the "rich getting richer". There is reduced public sector support for research while the pressures for technology development in biotechnological applications increases in the industry. The greater demand in the private sector is coupled with greater control over capital expenditure and purchase priority. Overall, there are delays in up-grading and replacements and only step-wise investments in projects. There is a customer need for dedicated packages with emphasis on achieving tasks and less focus on technology. Apart from the fact that customers on the whole are emphasizing applied research, are integrating disciplines and projects, and are turning to molecular biology research, the analysis indicate a shift in purchasing:⁴⁴

...Increased customer demands for quality, standards and added-value. Purchasing has become more sophisticated in all segments and loyalty to suppliers has become less..

⁴³Ibid

⁴⁴Ibid

The implications are obvious, according to the management group's analysis: the company needs to orient marketing operations more openly towards key account management, reduce market growth dependence, differentiate marketing, invest in added value services and improved customer/market intelligence. The same analysis contains indications of increasing competitor awareness of segmentation and focus - with most companies reverting to core business strategies.

Another, more specific customer analysis, shows a further important fact, relating to the organization of the contacts between Pharmacia Biotech and its customers. It shows that the three core divisions - all big enough to be companies - actually supply instruments, chemicals and services to a large extent to the same companies. A radical new thought is raised: shall Pharmacia LKB Biotechnology, Pharmacia BioProcess and Pharmacia P-L Biochemicals - the remaining core of the "new" Pharmacia Biotech company - move the organization towards *integrated* key account management operations? In the case of the industrial customers, the pharmaceutical companies, some of the known key accounts have integrated organizational structures with internal links between R&D project groups, the application/applied research units, the pilot plant units and the biotech production units. Other customers have looser, internal contacts between internal groups. Despite the fact that the three units do not always interact with the same users/buyers and organizational divisions among the customers, the question is raised when comparing the customer profiles of the three units:⁴⁵

Pharmacia P-L, Pharmacia BioProcess and Pharmacia LKB Biotechnology have high degrees of account overlap. Segmentation of account value is:

	Academic	Institute/Governmental	Private company
PhLKB	38%	21%	41%
P-L	55%	29%	16%
BioProc.	5%	10%	85%

The account overlaps that have been built up over the years have come to differ between pairs of internal units and depending on type of customers. The largest unit, Pharmacia LKB Biotechnology is shown to overlap with all of BioProcess' and P-L's accounts. P-L overlaps with 68 percent of PhLKB accounts, and BioProcess overlaps with approximately 20-25 percent of P-L's accounts. In addition, it can be seen from the customer lists that PhLKB still overlaps approximately 40-50 percent of Wallac's accounts. A more detailed analysis of e.g. PhLKB's and P-L's account overlap of 68 percent indicates differences depending on type of customers; while the overlap for

⁴⁵Ibid

academic research laboratory customers is 89 percent, the overlap among industry customers (mainly pharmaceutical laboratories) is only half, i.e 44 percent.

The new information not only confirms the need for a more focused key account program, but also raises the question as to how this shall be designed and how the internal organization shall be adapted to this situation. The general conclusion is that:⁴⁶

With these market pressures, fast response, customer orientation and "added-value" are essential for survival. We must have a rapid change from being technology driven to being market driven.

The discussions concerning a new view of customer relationships revolve around the need to change the general views of customers:⁴⁷

We must distinguish between key account and end-user, we must have an integrated understanding of decision making and purchase behaviour, and customer needs...We should not use the segmentation "private company" vs "academic" accounts as the primary segmentation. Key academic or government accounts have the same general demands as key industrial accounts. The most appropriate primary segmentation is "key account" vs "non-key account" - this then defines how and what resources we use for account management.

The central management group of Pharmacia's biotech operations directs the attention to the importance of connecting the whole organization to the needs and behaviours of the customers, based on ideas, analyses and plans which had been presented in late 1990 for the first time. The arguments for a focus on key account management presented at the meeting break with many institutionalized routines: the organization needs to focus better the internal priorities and connect the customer to the central functions, develop a better understanding of differentiated marketing and resource allocation, and get a stronger focus on "critical" customers and better understand account/end user dynamics.

The meeting's detailed focus on the present customer profiles, customer changes and the need to change the present profile of the contacts with customers is in part a radical break with established traditions of the biotech organization. It is coupled with self criticisms, motivated by the results of some general customer surveys:⁴⁸

We have very poor monitoring of our market position and image. In general we still over-estimate our image and actual position. Many of our assumptions have been based on past position and from loyal customers and not from the actual total situation...Generally we are no longer the leader - we are just one of several suppliers with no clear profile or image. We need much stronger focus on added-value service to improve customer perception and loyalty.

⁴⁶Ibid

⁴⁷Ibid

⁴⁸Ibid

It is also acknowledged that part of the problem lies in the diversified Biosystems Group, which is just to be dissolved:⁴⁹

We have a confusing and poorly coordinated communication strategy within Biosystems - customers receive a split and diluted image.....Our present service and image crisis is threatening customer loyalty and our business base.

In a general ranking of 11 companies, customers generally put Pharmacia Biotech in the fourth and fifth place when asked about quality, price, sales performance, etc. There is also emerging a communication problem in the new vertical organization; for example, customer complaints risk of being filtered on their way through the system, according to the survey. The self criticism concludes with the statement that the internal understanding of key account management and the drivers of the business is not sufficiently strong. Customer demands on added-value service have increased faster than anticipated and the company image towards customers is somewhat weaker than believed.

The new focus on customers and key accounts relates to the renewed emphasis on the regionalization program. At the January meeting, the discussions on a key account program are coupled with discussions concerning the inertia in the ongoing regionalization, especially in Europe. The discussions conclude that the renewed attempts to implement a decentralized and slimmed European marketing organization shall focus on a number of actions: better communication channels in the new vertical chain must be developed, it is necessary to speed up the implementation, there is a need to establish organizational stability for the new organization, the goals with reduced cost levels must be achieved, the ongoing distribution change program shall continue, and a systems for defining customer responsibilities - implementing a key account management system - shall be worked out in connection with the next step in the European regionalization program. It is the task of the European manager for Pharmacia Biotech in Brussels to formulate the details for, and implement, a key account concept.

The planning process that follows during the spring of 1992 relates to the development of a formal, theoretical model for a key account management system. Coupled with the other priorities of the new attempts to speed up regionalization Europe, the new manager for Pharmacia Biotech Europe in Brussels develops, together with the remaining central marketing functions in Uppsala, the first detailed models for a change towards key account management. The simplified general model which is presented in June 1992 draws up the broad shift for the future, describing the known approach of the company

⁴⁹Ibid

denoted "Reactive selling" and the preferred, largely novel combined approaches of "Key account management" and "Direct marketing":

Reactive selling: *no structured account strategy *sufficient contact to keep account "alive"
 *sales reps responding to customer enquiries *lead generation through direct marketing activities
 (telemarketing) *face-to-face contact for qualified customers *primarily mid- and small customers,
 and systems and contract selling.

to be compared with the preferred state of

Key account management: *individual account strategy *intimate understanding of customers'
 business: budgeting, buying, overall *face-to-face contact *primarily large customers.

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Direct marketing: *catalogue selling *telephone campaigns *direct mail *no face-to-face contact
 *minimum of technical specialist involvement.

The analysis and discussions in June 1992 also contain a detailed plan for the implementation process. The process shall be taken through five steps: analyse, plan, negotiate internally, coordinate and inform internally, and implement and manage. The first step of thorough analysis shall focus on Pharmacia Biotech's urgent need to know more about the actual customers, and spread this information throughout the whole organization. Hence, it is considered necessary to better understand potential key accounts' structure and internal "modus operandi", to identify key accounts' new projects, to understand key accounts' strategy with respect to R&D and their own markets, and to identify customers' concerns with regard to the use and purchase of life sciences equipment and materials.

Defining qualitative and quantitative targets for products and services are recognized as important, as well as the customization of services. It is also acknowledged that the perception of services will be different for different key accounts, but will most likely contain some given "ingredients": product quality aspects, distribution/delivery requirements, seminar/workshop programs, application support, clear pricing policy and discount tables, accessibility of technical know-how, and recognition of the key accounts' specific demands and pressures.

While the Central Divisions in Uppsala continue to discuss and implement operations and organizational structures to support the new, customer oriented and driven, marketing re-orientation, the Brussels unit continues to develop models for the new customer and key account adapted local organizations, and for the local, sub-regional organizations that are slowly reduced, changing from subsidiaries to local sales offices.

During the summer and fall of 1992, the process of reducing the administrative and management personnel in the local, national subsidiaries is resumed. It proves very difficult to reduce the subsidiary management resources while simultaneously introducing a radically new organizational idea, the sales branch office concept. Local management resources are needed to introduce e.g a new key account system, while a completed implementation means that the local administrative and management resources shall be reduced to a minimum. However, a key account analysis is performed during the fall, customers are classified, and a number of general models for the new local organizations are beginning to take shape. Two important results come out of the customer analysis and the continued discussions of a local organizational structure, adapted to a changed view of how the customer contacts shall be organized. A detailed analysis of the present customer situation is made which lays the foundation for a move towards key account management, and secondly, a general organizational model is depicted, describing the needed local functions which can support the development of a key account system.

Based on qualitative and quantitative information from all the local subsidiaries, a list is made which identifies and groups the present European customers according to importance. A tentative division into A, B, C and D customers is made, with A being the most important key accounts. The A customers are those which on average are visited 20 times a year, B customers around 4 times a year, C customers 1 time a year, and D customers which are considered to belong to the least important group. The number of customers in each group successively decreases from A to D. It is decided that the reorientation towards the customers shall be based on a strong focus on the accounts classified as A and B. While the attention of the established sales force in the local sales subsidiaries shall be directed towards the A and B customers, local tele account management functions shall be built up concurrently to handle the other customers, the more reactive sales of consumables and other, more simple, products. Telemarketing is to be directed towards *all* customers, while teleselling mainly shall be for the defined C customers.

As regards the important A and B accounts, the analysis made during the fall of 1992 and spring 1993 results in a classification down to the individual level. That is, among the important, academic university customers, a number of key individuals are identified with whom Pharmacia Biotech interacts, and who decide on larger and larger purchases of laboratory supplies. (The same analysis made in the USA among academic key customers shows a much more diverse picture, indicating that Pharmacia Biotech in some cases has built up contacts with over 200 individuals at the same university). The variety among the defined A customers is big; it can be an important professor at a university, a central

purchasing manager with a pharmaceutical company, an individual granted a large sum of research money and on the way towards building up a new research department, and so on.

The process of building up a regional key account management system in Brussels overlaps strongly with the ongoing processes of implementing a wholly new, standardized EDI system, introducing both new hardware as well as software to support communication in the new organization emerging in Europe. The new terminals and the software programs that are being introduced in the local organizations from 1992 and onwards provide some of the physical support for implementing a key account system. However, the account system also has to be supported by new local organizational structures adapted to the changed way of interacting with the customers. The Brussels organization, the newly appointed link-pins - the Marketing Area Managers - and the local subsidiaries on the path towards a steady reduction in organizational resources, start the process of local organizational adaptation by introducing a new role model.

According to the new general model for the local sales branches, irrespective of the present organizational and resource situation, the general change should preferably be towards a local organization of five general functions:

Key Account Management
Field Product Specialists
Customer Service
Tele Account Management
Technical Service

To support the field salesmen of Key Account Management and Tele Account Management, the sales branches shall have back-up of a group of field product specialists for the more complex products and systems, e.g for the industrial customers. A Customer Service function shall take care of incoming telephone contacts, answer questions, administer order handling, and so on. They shall also work in close connection with the Tele Account Management function. Lastly, the technical after sales services shall be handled by a Technical Service function, with resources to make repairs both at customer sites and in local workshops. Due to different organizational backgrounds and resource structures, the five function model shall be a role model, i.e. allowing local adaptations and changes.

It proves difficult to implement the model. The Brussels organization needs the local management groups for the implementation of a number of concurrent changes in distribution, EDI systems, administration and cost control, and quality improvements. The problem of both changing routines for the contacts between customers and local sales

units, and between local sales units and the regional organization, while concurrently changing the internal resources - adapting parts of the old internal sales, management and administration resources and recruiting new sales personnel (e.g. tele account sales people), and reducing the number of management and administration people locally - proves a difficult task. However, during 1993, the process of appointing local key account management groups and managers takes off and successively all local units install their own local key account managers. One of the issues which arises in the recruitment process concerns the product programs. The key account managers appointed are responsible for the whole product range. They do not need to be experts on the whole range, but need to have a general knowledge of the products as well as strong commercial competence. The idea is taken a step further in 1993 to adapt organizations and sales forces in order to reduce the potential difficulties for newly appointed key account managers who cannot be expected to be experts on both advanced chromatographic purification systems in the whole range from laboratory to industrial scale, and on the advanced molecular biology systems. An organization and concept is created whereby they are supported by product specialists of different backgrounds (purification-chromatography, molecular biology, electrophoresis, etc.).

FROM BRUSSELS TO FREIBURG - THE EUROPEAN REORGANIZATION PROCESS CONTINUES...

During the spring 1993, the regionalization program for Europe gains impetus from the decision to speed up the process and to take the program a step further. The new sales branch concept for the former subsidiary organizations, the increased speed in the distribution rationalization process with direct distribution to customers, the implementation of a standardization program for EDI systems and cost control routines across Europe, and the increased attention to quality improvements according to ISO 9000 standards all dominate the restructuring of the European marketing organization. Furthermore, steps are taken to decentralize central marketing support, increasing the Brussels organization's responsibilities for marketing planning and support.

One of the emerging problems in the regionalization process towards the end of 1992 concerns the future legal structure of the European organization. The branch office concept with a centralized administration requires a new formal ownership and legal structure, a transfer of goodwill, and so on. In this process, the idea comes up to move the regionalized administration activities to the big and powerful German subsidiary in Freiburg. Analyses indicate that the least costly alternative - considering goodwill costs and tax implications - would be to let the German organization "buy out" the other

organizational units and move all regionalized billing and cost control routines to Germany. If this proves to be the best, most economical solution, and the easiest way to legally create a new administrative organization for Europe, another problem will follow, according to the analysis. Is it rational and in accord with the new route of increased "industrialized" efficiency, profitability and continuous rationalizations to separate administration from marketing support in the European region? That is, can the new decentralized European marketing support unit remain in Brussels? Discussions on a relocation of the European Headquarters organization for Pharmacia Biotech intensify towards the end of 1993. Early 1994, the decision to move from Brussels to Freiburg is announced...

III. A NEW MOTOR FOR THE INDUSTRIALIZATION OF THE BIOTECH OPERATIONS - THE CAPITAL RATIONALIZATION AND DISTRIBUTION PROJECT

1989: ACCUMULATING DISTRIBUTION PROBLEMS FROM THE LKB-PHARMACIA MERGER

At the end of 1989, the market situation for most companies in the biotech supply industry is radically changed compared to the situation only five years earlier. The fast sales growth experienced at the end of the 70s and the beginning of the 80s has changed into a situation where biotech manufacturers are beginning to talk openly about the first serious "shake-out" of firms. Pharmacia BTG has profitability problems like most other suppliers. The effects and the problems stemming from the LKB merger are still felt in the organization. The expected profit targets and large joint market share have not been achieved. The merger problems coupled with increased competition and a decreasing demand for biotech products result in gathering profitability problems and lost market shares.

Some of the most significant effects of the LKB-Pharmacia merger remaining can be seen in inventories and inventory policies. As the control of the merger process in the global marketing system is taken over by the powerful Pharmacia subsidiaries in early 1987, one of the immediate effects is the start of a build-up of large local stocks of LKB products. The more distribution and cost oriented LKB organization had developed the policy in the early 80s to keep controlled, central stocks in Bromma and use the market subsidiaries mainly as transition points for goods on their way to end-users. Pharmacia's "pharmaceutical based" distribution tradition - keeping goods on the shelves near the customers - contrasts sharply to the LKB policy. As the merger process comes under the control of the Pharmacia subsidiaries, Pharmacia's inventory policies also come to overshadow those institutionalized within the LKB subsidiaries. In order to build up and secure complete Pharmacia-LKB product inventories locally, the Pharmacia dominated sales subsidiaries start ordering LKB instruments, parts and accessory goods. In a short period of time, LKB product inventories for up to 3-4 months sales are built up in many of the new subsidiary organizations, according to Pharmacia's over-riding policies. The lag effects of these actions are accumulating as a Capital Rationalization Project is started in 1990 to establish new distribution, inventory and logistical policies.

Another lag effect of the Pharmacia-LKB merger is noticed in the production policies and in the coordination between marketing and production operations. In principle, Pharmacia's production operations have been based on a fixed production plan, revised 4 times a year. Production is governed by invoiced sales figures. The procedures have

frequently been the cause of delivery problems. It is difficult to adapt to changing customer demands. In addition, a significant number of instruments are used in customer demonstrations, in local laboratories, and are not always registered. LKB's policy, on the other hand, has been to control production activities through coordination with the central inventory unit in Bromma. Simply put, production levels have been adapted to the actual level of delivered products.

Towards the end of 1989, former Pharmacia policies for distribution and logistics as well as for production control dominate the marketing and production systems. However, in the market subsidiaries and in the production units, a mixture of both policies is often applied.

In the fall of 1989, a number of projects aimed at radical profitability improvements in the corporation are started. One of these - the so-called Capital Rationalization Project - is one of the central projects in the new focused attempts to reduce costs and improve efficiency and profitability. It concerns the BTG's problematic distribution policies, focusing on the flow of goods from production units to end users. This formal decision to start a distribution and logistics project is a manifestation of the fact that BTG is entering a phase of "industrial" orientation, introduced by the new, externally recruited, Managing Director. Efficient and effective distribution flows in the whole vertical chain from production to end users shall balance the previous strong emphasis on technological driving forces of change, emphasizing research and development activities. Despite the fact that BTG's experience from radical distribution changes is limited, the vision set up for the project at the outset is a radically changed view of, and strategy for, the company's distribution, including a better knowledge of the customers' needs and demands concerning the procurement of goods.

While Pharmacia's experience from cost oriented rationalization programs is limited, an awareness of the necessity to control capital costs has emerged in the former LKB corporation during the 70s and 80s. The experience of capital rationalization comes to a large extent from former LKB personnel who have been involved in LKB projects dealing with efficiency improvements in purchasing and procurement procedures. It is generally admitted within LKB at the time of the acquisition in 1986 that there is also room for radical capital rationalizations within LKB. The almost uncontrolled expansion of the LKB product range during the first half of the 80's has been very inefficient, from a cost perspective. However, due to an increased use of integrated administrative and economic control systems and, compared to Pharmacia, due to the shorter intra-organizational distances, LKB has been able to implant a more cost oriented organization

culture. Increasing competition in the instrument business has also forced LKB to improve cost efficiency much earlier.

For several years, Pharmacia BTG has been acting in an atmosphere of sales euphoria. With annual sales growth of 15-30 percent, depending on product, during the first half of the 80s, emphasis has been put on advanced R&D, on attempts to balance the production capacity to the increasing demands for the products, and on new product sales efforts. Storing, physical distribution, logistics and overall cost control in the vertical distribution chains have been given relatively low priority in the company. In both LKB and Pharmacia there are large variations among subsidiaries in the way that cost control systems are handled locally. Many of the large subsidiaries with larger local, organizational networks, Pharmacia's US subsidiary for example, have developed their own internal routines for cost control.

The Capital Rationalization Project that is started in 1989 continues in different forms throughout the first years of the 90s. Later, when the project phase is over, the change process continues in all parts of the distribution chain and in a changing global organizational structure. In two years time, the former project is institutionalized; a completely new central, organizational function is created during the final stages in the change project - Capital Management. In a short period of time, a radically different view on the distribution activities is implanted in the organization. It overlaps with a number of other ongoing change projects, influencing both the processes of and the prerequisites for other change projects. At the time of the start-up phase of the project, the Procordia-Volvo deal is officially announced and BTG becomes part of an overall corporate change process. The distribution changes are not unaffected. In the course of the ongoing structural and operational distribution changes, the processes become part of a radically changed organization. Tensions and a break in the ongoing change process come with the creation of Pharmacia Biosystems, just as the distribution change process is about to be stabilized....

THE SITUATION ANALYSIS 1989

Besides the urgent need to become more market oriented - through improved communication and exchange with market subsidiaries and a better knowledge of customer needs - the newly appointed BTG manager in 1989 points to the need to give priority to profitability, efficiency and effectiveness before increased sales growth.⁵⁰

⁵⁰Executive Manager, BTG, information meeting, November 1989

The Biotechnology Group seems to be a company of contradictions. We have too large stocks but have problems to deliver, and we have too many people employed but have problems to launch our products....The company is now in an odd situation. The company has so many unique resources, but the output is meagre....

He states that a range of different problems can be observed in the organization due to both external and internal causes, but it is "a question of focusing on them in the right order and solving them rapidly".

A new Capital Rationalization Project becomes part of and embedded in a range of other intra-corporate, strategic change processes. In this context, the distribution project emerges as one of the most important and is given a high priority in the whole Biotechnology Group. Action to reduce costs and cut down on resources are already taken in 1989 - a large number of people have to leave the company in 1990 and 1991 - but analyses at the end of the year indicate that very high costs are tied to stocks in the production units, in the central warehouse in Uppsala and in the 21 stores tied to the market subsidiaries. A significantly large part of the capital costs are in fact related to the stocks dispersed with the subsidiaries.

As BTG's experience in pursuing large distribution system changes is limited, it is decided to bring in a logistics consultant firm to help in the initial analyses and in the implementation of the project. The consultant firm is engaged by the new BTG manager, who has been working together with the firm at other occasions. The project manager is taken from the internal operations in Uppsala.

During the spring of 1989, BTG experiences severe problems in the central store operations in Uppsala. The company has developed a completely new software program, DAS, for the storing activities which causes severe implementation problems. The production manager in Uppsala selects a newly appointed Bromma (the still remaining LKB operations) manager to handle the problems. Through this work he comes in contact with the new BTG manager and also becomes involved in handling the complaints building up in the subsidiaries concerning delivery delays in Uppsala. In the winter of 1990 this distribution project is merged with the consultant based capital rationalization program and an integrated Capital Rationalization Project is formed. The purpose is to handle the interrelated problems of logistics, physical distribution and stock policies, and capital rationalization. The whole chain of actors - from production units to end-users - are to be involved and affected by the planned rationalizations.

The first tentative analysis indicates that there are around 24,000 different products in stocks. A rough estimation also indicates that only around 50 percent of these can be labelled "active" - only 50 percent of the products are regularly purchased by customers and a large number of the instruments and components have been out of production for a long time. The stock of goods is varied, due to the complexity of the systems: there are electronic, mechanical and optical components, a broad range of complete instruments and instrument systems, a large assortment of liquid chemicals, gels and other reagents (ranging from very small, cold store chemicals to bulk chemicals), accessory goods like columns (simple glass columns and pre-packed gel columns) and various components connected to the computer control systems of the instruments.

By engaging an external consultant in the distribution project, BTG comes in contact with the distribution practices of a number of established Swedish mechanical engineering firms. It is necessary to establish some kind of reference points for the coming changes. In addition, a benchmarking analysis is made, where estimations of the inventory levels among the most important competitors are used. Quantitative profitability analyses are made - e.g. correlations between high profitability and low inventory levels - and the gaps between the competitors' and BTG's inventory levels are estimated. One of the first estimations of the gaps between BTG and some of its competitors in 1990 shows a considerable variation:⁵¹

	<u>Life Technology</u>	<u>BioRad</u>	<u>ABI</u>	<u>Beckman</u>	<u>Millipore-Waters</u>	<u>BTG</u>
M&A%	32	39	28	32	37	44
R&D%	8	8	12	8	8	11
Op. inc.	13,5	9	20	11	10	6
Inventory Rate %	22	22,5	18	21	21	<u>38</u>

* Inventory rate(IR) = inventory costs as percent of invoice value

Of the total 38 percent inventory rate, 17 are tied to production units, 10 to the central Uppsala inventories and 11 to the subsidiary inventories. The institutionalized policy at the start of the project is that all products shall be available in stocks, in the inventories of the marketing companies and in the production units.

During the initial analysis phase, the Bromma, former LKB, plant's inventories are successively transferred to Uppsala and in 1990-91, production is moved to BTG's production in Umeå and Uppsala. As the Capital Rationalization Project starts, some of the over-capacity in production resources that has been built up during the last year is reduced. It is difficult to calculate the size of the over-capacity in the total production

⁵¹ Ibid

system, due to the fact that no single unit in the distribution chain has taken responsibility for the total capital costs and of registering total inventories in the system.

The initial analyses also show big differences as between the subsidiaries in existing routines for handling inventory costs. Change implementation intricacies, and problems, can be expected due to this heterogeneity.

In addition to analyzing the operations of the production and marketing units it is also necessary to build up a basic knowledge about customer operations; the logics behind customer ordering routines and the customers' general supply chain requirements, including delivery demands. It is initially a question of analyzing the patterns of differentiated delivery demands among customers. There are obviously higher delivery service demands for certain crucial spare parts and chemicals than for e.g. certain bulk chemicals, for which regular purchasing routines often exist already. The knowledge of such general demand patterns is poor within the company, and is made part of the initial analyses. The analyses are to be used for estimating total lead times and stock locations. Even before the customer analyses are initiated, it is already obvious to the project group that irrespective of customers' delivery service requirements, stocks at subsidiary level have to be reduced. Part of the local, slow moving stocks must be transferred back to the central stores or production units.

The first tentative customer analyses performed by the project group confirm the expected heterogeneity among customers and the big differences between products concerning delivery requirements. Customers' demands for delivery services vary much depending on product use situations and circumstances. The heterogeneity of the products complicates the situation. On the one side, there are the molecular biology products and product users for which chemicals frequently have to be stored in direct connection with the actual use. At the opposite end of the scale are the industrial customers, using up-scaled instrument systems. These customers often sign long-term contracts for regular deliveries of bulk chemicals, and lead times of up to 3 months can be acceptable. In between these extremes, there is a large group of customers whose demands are in the range of 2-6 weeks. Despite the large stocks at subsidiary level, the initial analyses also indicate that for a number of products, service levels are too low. The new distribution routines shall have to be adapted to the fact that the number of instruments sold varies a great deal, and the life length of laboratory instruments is in general much shorter compared to the industrial installations. As regards the chemical products, distribution changes are complicated due to the fact that some of them, e.g. molecular biology reagents, need to be kept frozen.

The initial analysis and classification work is completed during the spring of 1990 and in May the project manager is able to announce that all 24,000 products have been classified according to a new code system. The first step towards measuring profitability on products instead of functions has been taken. In addition, a number of concrete short-term goals and long-term visions for the physical distribution begin to emerge. Goals for the period 1990-1993/94 are outlined. They encompass quantitative goals concerning the successive reduction of stocks, shortened lead times, total costs and delivery service. Based on the benchmark analysis, an inventory rate of 18 percent is set as goal. It is also considered necessary to implement, as soon as possible, some form of continuous report system - in 1991 it results in an "Inventory- and Service Report" system. Ambitious goals for the production units are also set at a later stage; lead times in instrument production shall be cut down to half before 1993.

A number of long-term visions for the distribution flows emerge during the initial period of analyses and planning. One of the visions set up for the future goods flows is that subsidiary stocks and the central inventories in Uppsala shall be replaced by one regional stock in each of the four continents. As the project later evolves - and influenced by the now emerging regionalization project in Europe - the idea is revised to three regional, central stores for Europe/Far East, North America and Japan. Eventually, production unit activities shall be governed by sales and by stock levels in the regional stores. Customer order manufactured products shall be distributed directly to customers. As part of the visions for the new total supply chain, involving the production units, is also an increased use of component and module suppliers coupled with an increased share of internal assembly activities.

The initial analyses later lay the foundation for a completely new and global product code - "Customer Order Service Code" (COSC) - denoting for every product an average delivery time level: 8-12 weeks, 4-8 weeks, 1-3 weeks, up to 1 week, and less than 24 hours. The code is set by the responsible product units and becomes a general guideline also for the sales personnel in negotiations with customers. This part of the project is affected by the two parallel projects set up for reducing the number of products in the product line and for introducing a new, standardized procedure for marking and registering the products of the new integrated BTG-LKB product line.

THE CHANGE PROCESS TAKES OFF

The operative phase of the Capital Rationalization Project starts in September 1990. At the big international meeting at Grisslehamn in Sweden - initiated by the new BTG president taking office the preceding month - plans are outlined for 12 change projects for the BTG organization, including the organization and operations of the R&D, production and marketing functions. The distribution project leaves the analysis stage and the Grisslehamn meeting marks an official beginning for the operative change. The project is given high priority and is strongly supported by the BTG management.

The project group has to decide where in the total distribution chain - between the customers and the production organization - that the change implementation shall be started. The initial analyses show that there are problems at all levels in the system, including significant coordination and communication problems between customers, the subsidiaries, central warehouses in Uppsala and the four principle production units. The decision is taken to start the whole process with the 21 market subsidiaries. It is assumed that one of the most important underlying causes for the present logistical situation is the diversity of distribution, ordering, and inventory rules and policies that now exist within the subsidiary organizations. In order to be able to change the functioning of the whole system, it is necessary to introduce a reasonable set of standardized rules at subsidiary level to bridge the problems which the heterogeneous mix of Pharmacia and LKB policies has caused. Something has to be done about the inventories and the inventory policies, starting at subsidiary level.

The local routines for ordering and inventory refill policies are directly or indirectly linked to three central problems that have to be handled: 1) the problem of communication between marketing units and production leading to market companies ordering products taken out of production, 2) lack of coordination between units for better sales/production prognoses and 3) product quality problems in the production due to disturbances in the distribution system. A dialogue with the marketing subsidiaries has to be started concerning local policies, based on a general awareness and on actual experiences among all parties involved that these are factual problems. A general awareness of the critical market situation in the biotech business and for BTG shall help create an openness and receptiveness to change.

The project group, consisting of the project manager, the consultant and representatives from the central distribution, marketing and information system functions, decides to approach the marketing subsidiaries with a formalized agenda of points to cover in the

discussions with subsidiary representatives. The agendas and the discussions form the foundations for specific action plans adapted to the situation in each subsidiary. It is decided from the start that the agendas, the discussions and the action plans shall form the basis for improved communication and information exchange.

Plans are set for the order in which subsidiaries and later also production units are to be approached. The general distribution and market situations call for fairly rapid changes. One way to achieve a rapid cost reduction based on new routines would be to start with the large and most important marketing organizations. On the other hand, the large subsidiaries are also more powerful, acting more independently in relation to the parent organization. It is decided to start with the UK subsidiary. It is one of the most important companies in the European market and is by tradition considered progressive and "change oriented" in many marketing areas. It will serve as a test case for the distribution change.

The meetings with the UK subsidiary are held locally, as with the other subsidiaries, during the autumn of 1990 and the first months of 1991. The project manager meets personally with the subsidiary personnel, which in most cases includes managers at high levels in the subsidiary organizations, e.g. the subsidiary M.D. Agendas are set up for the meetings. Local practices, policies and organizations are discussed and analyzed. Detailed goals and action plans, including time limits for specific changes, are decided on. Visits to subsidiaries and the work to initiate communication routines concerning logistical and distribution matters continue until the the first months of 1991. After the UK and some of the other large, European subsidiaries, it is time to turn to the large US company, followed by the Japanese subsidiary. Thereafter attention is directed to the smaller European subsidiaries. The meetings and discussions are intense. For the new rules to be implanted in the subsidiaries, it is necessary, according to the project group, to establish an atmosphere of confidence and trust.

Apart from the new rules for ordering that are introduced to the subsidiaries - what is ordered shall be a reflection of what has actually been sold - the discussions also center around improvements in the communication of what products are presently available and still in production in BTG's total product line. The preceding product coding and standardization program and the parallel proceedings in the product rationalization program - cutting down the number of products to 12,000 - facilitate the project group's opportunities to meet the subsidiaries' requirements in this area.

When the first round of visits to the subsidiaries is completed in the spring of 1991, it is time to turn to the production units. The project group considers it necessary to initiate

production capacity planning as soon as possible, which can match the new, emerging ordering routines in the subsidiaries. Production capacity estimations are made in connection with the closing down of the Bromma plant. Standardized routines for making production prognoses are developed and sales figures from the subsidiaries become the most important input to the planning process.

Because the initial analyses have shown that the lack of communication between the Uppsala organization, the production units and the marketing subsidiaries is one of the most serious problems, the first contacts are followed up by a continuous flow of information exchange. The agendas are important focus points for the contacts. In addition, the communication is made possible by a successive implementation of the new EDI network. For every new subsidiary in Europe approached to implement of sales-based, direct ordering routines between the local units and the Swedish and US based production companies and stores, simple terminals are replaced by local computers. In the new expanding regional office in Brussels, new computer hardware is installed to support the new on-line communication links between the local units and Brussels, and between Brussels and the production units.

A NEW ORGANIZATIONAL STRUCTURE EMERGING; THE CREATION OF BIOSYSTEMS AND REGION EUROPE

After most of the local distribution change processes in the marketing subsidiaries have been started and have been taken over by local project groups in 1990-1991, the central project group is disrupted by the announcement of the Volvo-Procordia deal, making Pharmacia, including BTG, a part of the Procordia corporation. The deal is signed in December 1989 and pre-merger activities between Procordia and Pharmacia are started in 1990.

The Capital Rationalization Project Group is affected, as are all other ongoing change projects and organizational units, by the Volvo-Procordia deal. Beside the necessary preparatory steps that have to be taken for the reorganization - the creation of the integrated Biosystems Group - the project group also needs to decide on whether to continue the distribution changes as planned or wait for the results of the reorganization of Pharmacia, including the BTG units. The planning procedures for the new Biosystems Group do not interrupt the ongoing processes immediately, as long as the decision remains that Biosystems shall be a holding company structure. However, things become more complicated as the decision is revised and Biosystems in 1991 successively moves towards becoming a new integrated operational unit. All seven companies within

Biosystems are to operate in a matrix organization towards the same, also integrated, new regional companies and reorganized local market companies. It implies that the process of successively separating the biotech and diagnostics operations is reversed.

The distribution project group decides to continue the BTG initiated distribution change as planned, waiting for the immediate results of the corporate reorganization. Big planning procedures for Biosystems are set in motion, mainly centrally, but also involving the marketing subsidiaries. It is soon discovered that BTG's and Pharmacia Diagnostic's respective activities and customer groups are so diverse that an operational integration will be difficult. However, in the proceeding internal analyses of the distribution and logistics projects, new Biosystems companies have to be included. The BTG controlled and oriented project is in the start-up phase for an in-depth analysis of product profiles, customer profiles, transaction profiles, order structures, and sales and gross profit figures for the period October 90-September 91. The revised analysis - focused on Europe - now encompasses separate analyses of the main companies targeted for radical distribution change: Pharmacia BioProcess Technology, Pharmacia LKB Biotechnology, P-L Biochemicals, Pharmacia Diagnostics, Wallac, and Pharmacia Deltec. When the extensive analyses are later presented and discussed, in the spring 1992, the Biosystems organization has already been dissolved. The idea of a joint Biosystems Group is dropped, despite the time and efforts devoted to planning and change in that direction.

Strongly connected to the Biosystems venture in 1990-1991 is the project to regionalize the international marketing organization. Influences from the capital rationalization project result in a second, additional and specifically European-focused logistics project. The new Biosystems unit for Europe, in Brussels, manages to initiate, within the formal organization of the regionalization project, a separate logistics project parallel to the already started Capital Rationalization Project. Influenced by the ideas and visions of the latter, the new European project plans for a change whose aim is to centralize storing and inventory activities for all the integrated units in the Biosystems Group (BTG, Diagnostics, Wallac, Biosensor, Sebia and Deltec). When the Biosystems idea is dropped in the beginning of 1992, so is the separate European logistics project.

Despite the interruptions it has caused for the Capital Rationalization Project Group, Biosystem's European logistics project has been an indication that distribution and logistical matters have been accepted. Operationally, the discontinued European logistics project has also indicated to the project group that central stores shall, at least in the initial phases, remain in Uppsala. Analyses show that if the central stores are placed in Holland, which were in the original plans of the dissolved European Biosystems logistics group,

the actual service level will not increase significantly. The idea of direct distribution to end users which has been part of the long-term visions, is gaining supporters in the original distribution project group.

Notwithstanding the above disruptions, the second step in the change process involving the subsidiaries can be taken: to implement the idea of differentiated distribution. Already during the second half of 1991, the Customer Order Service Code is implemented. The subsidiaries now start the new ordering routines, based on the new code system where products are grouped according to fixed, average customer service requirements regarding delivery times. When this is started during the second half of 1991, the first direct capital rationalization effects can be observed.

In 1991, as the Biosystems Group is established, the Capital Rationalization Project Group suggests an institutionalization of the program. The Project Group has been reporting to the new International Operations function within Pharmacia LKB Biotechnology - which has the overall control over the biotech supply units in the marketing subsidiaries - and has been strongly supported by the manager of the latter. As Biosystems is created and the International Operations manager moves to a new position in the organization, the Capital Rationalization Project is given a new position in the organization. With support from the BTG management group, the distribution and logistics change is acknowledged in the organization as very important to the whole biotech operations. The already implemented changes are beginning to show results. Rapid, significant cost reductions are beginning to show in the figures. The future cost reduction potentials are acknowledged; the program will most likely continue for a number of years ahead. Despite the organizational interruptions, there is momentum in the distribution change process in the beginning of 1992.

A central Capital Rationalization Function is established with responsibility for the control of logistics, distribution, product administration and EDI systems. The new, improved status is further strengthened by the fact that the Project/Functional Manager is given a position in the central BTG management group. The original distribution change ideas, which have turned into a project group and a number of ongoing change activities, are thus legitimized as a new organizational unit and function in the biotechnology group.

LINKS TO OTHER CHANGE PROCESSES; THE AFTER SALES SERVICE PROJECT

As the Capital Rationalization Project takes off, it is given no particular priority by the newly appointed After Sales Division. In August 1990, when the Project has progressed a year, one of its initiators, the newly appointed BTG manager, leaves the company after one year in the organization. The new, externally recruited manager for the biotech operations is appointed. A month later, a new manager is also appointed for the new After Sales Division, controlling the large supply of spare parts and the technical service activities.

The real contacts between the Capital Rationalization Group and the new After Sales Division are intensified after the period of management changes. The capital rationalization activities have not yet reached the spare part operations, which is the main area linking the distribution project with the newly focused after sales activities. A large number of the products that are to be ordered, transported and stored according to the new emerging logistical principles are spare parts under the control of the newly formed After Sales Division. At the end of 1990, the Division becomes involved in the project, as instructions come that the spare part policies have to be reviewed. Analyses show that spare part inventories at the time have a value four times that of yearly sales. Evidently, there is a potential for large improvements.

The increased attention paid to the after sales operations 1990-1991 coincides with the equally intensified contacts between the market subsidiaries and the Capital Rationalization Group. Both groups need to (re)direct attention to other matters than those which overlap, i.e. those which concern the large and inefficient spare part operations. On the priority list of the After Sales Division are three projects: the creation of long-term continuity in the customer contacts through the sale of service contracts, reviewing the routines for invoicing and pricing of the after sales services, and thirdly, reviewing the whole economic control and report system for the service activities. The spare part inventory and distribution matters - representing a considerable cost in the total distribution system - are not in focus in the after sales change projects, excluding matters concerning the dated pricing policies where they are in focus. A general price increase of 10 percent and distribution of new spare part price lists to the subsidiaries signal the fact that After Sales is to become a profitable business with profit responsibility. The change is met by scepticism and negative reactions from many of the subsidiaries, but the general change is supported by the newly appointed BTG manager and the subsidiaries have to accept the new price policies.

At the end of 1991, as the capital rationalization group turns the attention to the production units and the central Uppsala organization, the After Sales Division is drawn into the capital rationalization activities, and a new change priority has to be added to this Division's list of important change activities. In the internal discussions it is decided that the After Sales Division is to work out a new standardized spare parts policy for the market subsidiaries and for the central units, including production and central distribution. Questionnaires to investigate customers' spare parts service demands are prepared and plans are made for the implementation of standardized and more efficient spare parts routines. The turbulent spring of 1992, when the After Sales Division manager and other Biotech personnel are made redundant, causes a stop in the implementation of the new spare parts program. After the spare parts changes, the After Sales Division turns back to the original priority areas for change, the development of new routines for sales of service contracts.

CHOOSING A NEW TRANSPORTATION AND LOGISTICS STRUCTURE

The dismantling of Biosystems and the centralization of the project responsibility back to the Uppsala based project group create a momentum in the distribution change process. The various analyses and reports performed during 1991 - despite the fact that they have been made for the whole Biosystems group but separating the various organizational units - can be applied when taking a more radical step in the process of redirecting the distribution routines. Based on a thorough case study of the transportations and logistical flows between Uppsala and the German subsidiary, discussions intensify on what new transportation structure to choose. For the first time, indepth, detailed distribution cost analyses are made. The Uppsala-Freiburg case indicates that for a unit handling, the resources required in Germany and the costs for the transportation between Uppsala and Freiburg each encompasses several areas for cost reductions. Resources management and product handling which are in-built routines in the German subsidiary encompass substantial costs for: order entry (personnel, EDP, office space, other costs), physical order expedition (personnel/warehouse, EDP, packing material, office space, other costs), warehousing (personnel, warehouse space, other costs), replenishment orders (personnel/warehouse+purchasing, EDP, office space, other costs), and fixed costs (general administration and other costs). Added to this, the transportation costs for Uppsala to Freiburg entail significant costs for duty, forwarding, local distribution in Germany, and more. In the new logistical and transportation options that emerge from the discussions and cost analyses, the idea of radically reduced costs through the implementation of direct deliveries to end customers gain supporters. Discussions concerning a new regional distribution point circle around three options: Amsterdam,

Uppsala, or Amsterdam & Uppsala. Irrespective of which distribution point is chosen, all discussions point to the advantages of direct distribution:⁵²

Direct deliveries from suppliers to end customers similarly rely on fairly expensive transportation. In this case, the reduction in unnecessary handling by the Uppsala Central Warehouse and marketing company warehouses not only reduces costs, but should also increase service. The fewer transactions which these orders incur, the less chance of an instrument or bulk chemical shipment going astray or being damaged. And these benefits will accrue irrespective of RDP location.

Costs simulations and discussions all point in the same direction; Uppsala shall be regional distribution point for the new European logistics system. However, the general idea of direct distribution raises concerns in the organization:⁵³

There has been some concern expressed that direct delivery of instruments would bypass the important final testing of systems components by a nationally based service technician prior to installation at the customer site.

The important installation phase needs to be included in the plans for the new logistics systems. Various combinations of alternative solutions to be included are forwarded, affecting different ends of the distribution chain: alternate distribution plans can be developed for "installed" versus "plug-in" instruments, supply plant routines can be modified to incorporate full systems quality assurance testing, systems specification procedures need to be revised, service technician installation kits can be developed to incorporate small components needed to complete any installation of a product group, and where necessary, instruments shall be sent to a national (or sub-regional, multi-country) technical workshop.

The process to successively implement a demand driven, direct distribution system with the Uppsala Central Warehouse as regional distribution point, also includes visions about demand driven production and demand driven assembly. In a first step, the radical distribution change cannot be achieved without improvements in both production and in the communications with the four biotech production units. And these requirements vary:⁵⁴

More importantly, Umeå, Steninge, Uppsala Chemicals, and Biochrom(Cambridge) require varying levels of production and communication improvements to cope with direct deliveries.

If adapted, analyses indicate that the high rise stocking facility at Umeå can become a finished goods and international shipping facility for biotech instruments. If instrument inventories at the Central Warehouse and in the local subsidiaries are eliminated (and

⁵²Pharmacia Biosystems Europe, *Logistics Report*, Final Report, Biotech Simulation, 14 April 1994

⁵³Ibid

⁵⁴Ibid

replaced by component inventory where necessary), the factory's present manufacturing and component sourcing system can be better utilized. The question is how far this process of pulling back the stocks of instruments can be taken in the first step.

As regards the bulk chemical production plant in Uppsala, the production process in itself creates problems which now have to be coped with:⁵⁵

...the production process itself represents the key potential problem in reaching production plus delivery lead times that meet customer expectations. With large batches, the excess products must then either remain at Uppsala or be transferred to the European warehouse to meet subsequent demands.....would suggest that the entire production philosophy be re-thought to a more market-driven orientation.

The differences between the production units are obvious. The Biochrom plant represents a fourth situation:

The Biochrom operation has been converted to kanban and U-shaped manufacturing cells. These changes, plus their tests on direct delivery in Germany, put them ahead of other BTG supply units in terms of modern manufacturing and material handling capabilities.

Despite the fact that the production units need to be involved in the process, most efforts in early 1992 are devoted to the many choices that need to be made concerning the new direct distribution and logistics system; an entirely new transport solution needs to be found and details about the direct distribution operations have to be sorted out. It is necessary to find a logistics solution which meets the requirements of both customers who may order process chemicals based on a production schedule, and of the local sales companies who can arrange to have a service technician "meet" the instrument for installation. Two important questions emerge: What transportation solution and transportation partner shall be chosen? And, shall customer orders, due to product and user differences, be split between items for next day delivery and 3-5 day delivery?

As regards transport solution, a third party logistics partner needs to be found. The analyses made in 1991-1992 direct attention to three types of express parcel carriers, suitable for transporting the many, relatively small, biotech packages containing instruments, consumables as well as chemicals: traditional (often local) forwarders, transport companies with extensive alliances, and pan-European integrators. Competitor analyses and general analyses of common transportation policies in the health care/pharmaceutical/biotech complex point to an increased use of integrators - TNT, DHL, Federal Express and UPL. The various integrators' expansion strategies in the European market also need to be part of the considerations. Eventually, DHL is chosen as partner in the process of changing to direct distribution, and becomes in each new country and sub-

⁵⁵Ibid

region an important cooperation partner in the successive introduction of new logistical routines.

The question whether to differentiate the distribution, and transportation, into next day and 3-5 days delivery is complicated by the fact that the latter type will be connected to problems due to the structure of the transportation industry:⁵⁶

Unfortunately, because of the way the transportation industry has segmented itself, such a service is not widely available on a pan-European basis. Delivery in 3 to 5 days anywhere in Europe is not the issue - literally hundreds of forwarders can provide such service - but not with a "to the day" or "not later than" delivery guarantee or for that matter any type of guarantee. These transportation firms also typically do not provide electronic tracking of goods, which enables them to tell what has happened when goods do not arrive on time or go astray.

Despite the fact that the products, customers and order and transaction structures for the molecular biology organization, the laboratory equipment organization and the process equipment organization differ, the choice is taken to standardize as far as possible the direct distribution concept. Processes are started to make the Central Warehouse in Uppsala the new regional distribution point for Europe, to integrate information and physical distribution routines with DHL, to introduce, step-by-step, a new country or sub-region into the new direct distribution system, and concurrently, draw back the local inventories and introduce new information systems and administrative routines.

APPLYING NEW REPORTS ON CUSTOMER REQUIREMENTS TO THE LOGISTICS PROJECT

Between November 1991 and April 1992 - as a sub-project to the still running Pharmacia Biosystems Europe Logistics Project - customer and marketing subsidiary requirement surveys are undertaken by the Brussels organization via the marketing subsidiaries in Germany, UK, France, Spain, Italy and Holland. When the European logistics project enters a phase of rapid change in 1992, the survey becomes an important input when shaping the new distribution routines.

The results indicate above all that the change process needs to be speeded up and that customers' evaluate reliable delivery very highly. Unfortunately many of the existing competitors rank higher than Pharmacia Biotech:⁵⁷

Pharmacia often did not rank highly against these priority criteria, especially for BioProcess products.

⁵⁶Ibid

⁵⁷Logistics Project, *Customer Requirements Reports*, May 1992

The survey indicates differences between the three Pharmacia Biotech companies' customer preferences, and signals requirements which involve logistics-related topics controlled by other project groups, e.g. concerning quality standards (the ISO 9000 project) and speed of repairs and performance of technical services (the After Sales Service project). In general, the industrial BioProcess customers give a relatively higher priority to new ways of ordering, due to the crucial need to obtain emergency repairs/spare parts for production systems.

The total customer requirement survey comes to one over-riding conclusion which is to guide the continuing changes:⁵⁸

It is therefore essential that the supply chain functions as an integrated whole, focused on the customer, and not as separate islands. This will require a single, common database, integrated computer systems throughout the supply chain, effective information flow, efficient working practices (conforming to ISO 9000 standard) and a clear, consistent Logistics Strategy....In discussions with both customers and subsidiaries it is Reliability which is mentioned as the key word time and again.

A list of twelve general, customer based recommendations for the distribution change come out of the enquiries. The logistics change shall be governed by customer perceptions of reliability, an integrated database is required, integrated and standardized working practices and policies are needed. Other requirements are put forward: improve subsidiary switchboard answering and delay delivery information, shorten repair times, improve back order routines, provide accurate delivery information on all occasions, move towards shorter delivery times on non-molecular biology consumables, improve the interface between product development, production and the customer, improve all performance measurement practices, and more.

The customer/market subsidiary survey results in a priority list for improvements divided in six areas: Distribution, Product Management, Production, Marketing, Product Development and General. Each of the six areas is divided into sub areas, and each requirement area is labelled Urgent, Short Term or Long Term improvements. In total, eight items are distilled and placed in the group of urgent customer requirements, six of which concern distribution and delivery requirements. The urgent topics concern: provision of accurate delivery times, updating of BioProcess customers with order delay information, subsidiary access to information on central stocks and delivery times on out-of-stock products, include accurate delivery time of back-ordered products to customers, faster delivery on out-of-stock products, and improve information from the four production units concerning delays.

⁵⁸Ibid

The detailed customer survey, including customers' perceptions of complementary/competing suppliers, becomes an important input to the coming steps in the logistics change.

1992: SUMMING UP THE PAST AND HEADING FOR A NEW START OF THE LOGISTICS PROJECT

When Biosystems is closed down and the new, separate biotech company Pharmacia Biotech is established in the spring 1992, the central, Uppsala based logistics group can look back at 2-3 years of both progress and open disturbances in the process towards implementing a completely new distribution structure.

The analysis and legitimation phase has lasted over a year, between the fall of 1989 and September 1990. In contrast to many of the other projects, the logistics project group has gained good contacts during this phase with, and legitimation among, both central and local management groups. The extensive travelling and intense contacts with local subsidiaries have helped to legitimize the planned change. Minor changes in order and administrative routines have been started. The planning and analysis phase has been disrupted by the announcement of the Procordia-Pharmacia-Provendor deal, and the successive implementation of Biosystems as new holding company unit. The capital rationalization program has continued the planning stage throughout 1990 and the beginning of 1991. Just as the central logistics project is about to leave the planning stage and implement a new, centralized storing concept, the Biosystems venture leaves the holding company idea behind and moves into the process to establish Biosystems as an operational structure.

There are several direct effects from the collision between the logistics change process and the new path of the Biosystems venture introduced by the newly appointed Biosystems manager. The biotech focused capital rationalization project in Uppsala is complemented with a completely new European Logistics Project, with a new project group operating from Brussels and incorporating in the planning and analyses all companies in the Biosystems group. The four new Regions are formally established and responsibilities are being transferred to the new regional offices. The Biosystems organization is positive to the contents of the biotech focused plans of the Uppsala project group, but decides to move the responsibilities to Brussels and make it a Biosystems rather than a BTG venture. A number of external consultants are called in to perform the new analyses.

When the capital rationalization group in Uppsala looks back, in the beginning of 1992, on the year that has passed, many unanticipated revisions of the original plans to change the logistical system have obviously been made. With another logistics project in Brussels, the original plans of the Uppsala group to focus on the contacts with the European units have been revised.

On the whole, the process loses speed towards the middle of 1991. The Uppsala capital rationalization group also redirects the attention and contacts are taken with other counterparts in the organization. While the new project group in Brussels plans for a Biosystems logistics project, the Uppsala group directs attention to the three other Regions and continues the work in Europe by approaching each national subsidiary directly:⁵⁹

What we did was to continue the small day-to-day improvements in the existing structure, taking it in small steps. We approached the subsidiaries directly, bypassing the organization in Brussels. We had to keep the project going. We were lucky to be able to present continuous cost reductions and other improvements. Luckily, due to BTG's bad situation, the room for radical improvements was considerable. In Europe, we lay down the plans for a radical change of the logistical structure and concentrated instead on improving the efficiency in the existing structure.

However, during 1991 other problems appear, due mainly to the emerging idea to implement Biosystems as an operational structure. The attempts to persuade the companies in the Biosystems Group - mainly Wallac, Pharmacia Diagnostics and Pharmacia Deltec (Sebia and Biosensor being less important due to the size of the companies) - to become involved in the Uppsala group's logistics project are unsuccessful. While the project group can see that logistical synergies can be achieved if the distribution flows of BTG, Wallac and Pharmacia Diagnostics are integrated, there are open doubts whether any synergies can be achieved with US based Pharmacia Deltec. While the three former companies to a large extent are selling to the same companies and to customer departments with similar types of purchasing and ordering behaviour - most often, however, to users in *different* departments - Pharmacia Deltec has a different type of logistical structure:⁶⁰

Pharmacia Deltec had a completely different type of products (medical devices), a different kind of distribution structure and completely different types of formal demands concerning the control routines for their products. In some countries, every batch of medical devices had to be controlled and registered according to national regulations. This made it more difficult to centralize the stocks of Deltec products. The small size of the products and the user situation - the customers, the hospitals and clinics that is, needed to have the products on their shelves - made it difficult to integrate Deltec in our plans.

⁵⁹Capital Management Manager, Fall 1993, transl.

⁶⁰Ibid

There are synergies with Wallac and Pharmacia Diagnostics but despite this, products continue to be separately transported to the same addresses. The two companies show little interest in participating in a logistics change program. The ambiguity caused by the operational Biosystems venture continues throughout 1991. However, in the spring of 1992, the circumstances for the Uppsala logistics group come to change radically; Biosystems is discontinued and Pharmacia Biotech is created.

Despite the ambiguities caused by the Biosystems venture, there are some openly acknowledged positive effects of the interruption, the most important concerning the geographical location of the central distribution point for Region Europe, replacing the 21 local distribution points and reducing the central store in Uppsala:⁶¹

If we had been able to start the centralization of the stores in 1990-91 as planned, the central stores would most likely never have been placed in Uppsala. At that time there were simply no way that we would have been able to convince the whole organization that Uppsala should be the new central distribution point. The political situation in the organization and the many ongoing change processes all pointed to a regional office and stores in a more central place in Europe. Although we had arguments also for a transfer to Uppsala, this was not considered politically possible at this time.

However, in 1992 things change. The second logistics group in Brussels is concluding its extensive situation analyses. Unexpectedly, their results support the Uppsala group's earlier conclusions. All cost estimations and customer based logistical simulations point in the same direction; a central distribution point in Uppsala is superior to the main alternatives, i.e. a regional distribution point in Amsterdam or a combination of Uppsala and Amsterdam.

Apart from this, when the responsibilities for the logistics projects is taken over again by the Uppsala group in the beginning of 1992, they have a very rich source of information and analyses to use. The Brussels group's customer and logistics analyses become important inputs when the logistics project is restarted. Despite a loss of time and money in the Biosystems venture, the Uppsala capital management group can acknowledge also positive effects of the delay.

1992: A RAPID TAKE-OFF OF THE LOGISTICS CHANGE PROCESS AND SYNERGIES WITH OTHER ONGOING CHANGES

In the spring and summer of 1992, the logistics change process gains speed again. In cooperation with the chosen integrator, DHL, local project groups are started in each new

⁶¹Ibid

country involved in the change process. Together with DHL, local transportation and administrative solutions are worked out. The chosen strategy is to start the reorganization of the distribution flows as near the customers as possible, in the subsidiary organizations. The Benelux countries are to function as test markets for the change, followed by the UK and later by the Nordic countries. Thereafter, Germany, Italy and Spain are to follow. For internal, organizational reasons, the French organization is left alone for the time being. The French organization is still strongly coupled with Kabi-Pharmacia in France. In addition, the French subsidiary is by tradition one of the European subsidiary organizations which most strongly has integrated the organizational routines for the three former Pharmacia units for pharmaceuticals, diagnostics and biotech, the latter including the integrated operations of Wallac.

The rapid take-off of the process to transfer the local stocks back to Uppsala in 1992 and change ordering routines complies with several important changes in the organization of the restarted process. Several project groups now coordinate their work. The logistics group coordinates its activities with the regionalization group, implementing the new branch office concept, and also with the local personnel responsible for the exchange and standardization of EDI system. The momentum in the logistics change process is partly driven by the rapid take-off of the branch office change towards the end of 1992. Many of the local, political problems can be avoided. When former subsidiary presidents are moved to the regional office in Brussels or leave the organization completely, the new biotech branch office managers are easier to lead into the process of logistical change. The old power structures are changed concurrently.

The minor revisions that are made during the course of the change process in 1992-1993 are connected to the revisions in the branch office change. Some minor, unexpected effects of the changes in local management in some cases cause delays and revision of the order in which the local subsidiaries can be turned into branch offices. The new branch office managers' responsibilities are radically reduced.

Other minor revisions in the logistics projects relate to differences between the three Product Companies of Pharmacia Biotech. The dismantling of Biosystems, and the differences between its various companies, have drawn most of the attention. Now attention can be directed to the fact that there are also logistical differences *within* the biotech group; between Pharmacia LKB Biotechnology, Pharmacia BioProcess, and Pharmacia P-L Biochemicals. The problems and revisions are not comparable with the difficulties experienced when trying to coordinate the different Biosystems companies.

Throughout 1992 and the beginning of 1993, things are happening fast in Pharmacia Biotech. In little more than one year, logistical routines are changed in the Benelux, the UK, and Nordic regions. Concurrently, with the transfer of stocks emerges the adaptation of existing software, exchange of local computer hardware into terminals, the on-line link up with Brussels and Uppsala, and the new trimmed distribution routines together with the general reduction of local organizations. Towards the end of 1993, as the change process is stabilizing, the central and regional project groups head for the second step in the distribution change.

In late 1993, the distribution change is gaining momentum and the organization is ready for the next step; it is time to incorporate the four production units in the logistical change. In the plans are a move to the next step and the introduction of a demand driven distribution and production. Sales fluctuations shall be mirrored in the production. Stronger links between customer demands, the regional distribution point in Uppsala and the production operations in the four factories need to be established. It is time to connect all three regional distribution points - Brussels, Piscataway and Japan - to the system. Plans are made for a stronger integration of the production units in 1994. The first tests are made to integrate the Umeå factory production operations to the European distribution point in Uppsala. Concurrently, projects are started in the Uppsala and Umeå factories to change the supply structure to the production. The ongoing change in the branch offices to build a stronger connection to key accounts, mirrors ongoing changes and plans for changes in the contacts with suppliers. A new integrated distribution flow is beginning to emerge.

IV. STRIVING TO IMPLANT A NEW VIEW OF TECHNICAL SERVICES AND LONG-TERM CUSTOMER RELATIONS - THE AFTER SALES SERVICE PROJECT

1986-1989: A STREAM OF DISTURBANCES IN THE INSTRUMENT SERVICE OPERATIONS

In 1986-87, a new LKB-Pharmacia Instrument Service unit is established in Uppsala. The 21 LKB technicians and employees are integrated with the 11 technicians of Pharmacia. Successively, a new central unit for back-up support to the merging subsidiary organizations' technical service personnel is formed. The new unit is placed in Uppsala, and the Bromma unit is moved to Uppsala by as early as 1987. The new, merged unit has no divisional status. The main tasks are to support the subsidiaries and customers with technical information and to perform some of the repair work coming back for central repairs.

During the autumn of 1990, a specific After Sales Service Project begins to take shape in BTG. One of the change areas identified by the new BTG manager and the management group in the autumn of 1989 concerns the instrument service operations. For the Instrument Service Manager in Uppsala, a former Technical Service Manager transferred from the LKB organization in Bromma to Uppsala in 1987, it is the fourth BTG manager, since the merger, to whom the problematic situation for the central, technical service unit has to be explained. The first time after the turbulent years of the LKB merger that the after sales operations are given the status of prioritized change area is at the international BTG meeting held at Grisslehamn in September 1990. However, it is one among eleven other change projects, of which a number are already in the start-up phase and attract considerable attention. The Capital Rationalization Project and production projects are among these. The announcement of the Volvo-Procordia deal and the organizational consequences of it is another.

During the period 1986-1989, when the Instrument Service Manager has formal control over an ever shrinking central unit, the number of people is reduced from 32 to 18. Many leave the company to find jobs in other companies. During the three year period, the central Service Unit's attempts to restructure the technical service activities become heavily focused on two areas: urgent matters resulting from problems to merge the subsidiaries' local service support organizations, operations and routines, and on the internal administration, cost control systems, division-of-work, and standardization of routines, i.e. on cost and profit allocations.

The problems build up, and successively the focal matters are narrowed down to a few critical areas, most of which have to do with the heterogeneous operational and organizational structure emerging in the subsidiaries. It is a matter of starting anew, building up new contacts and trying to find new, and more standardized internal report routines between the subsidiaries and the Instrument Service Unit in Uppsala. There is little time and few resources available to develop ideas concerning new routines for handling the service contacts between the subsidiaries and the customers.

More alarming is the fact that the contacts with the new, merged subsidiaries appear to be narrowing down. Any attempt to strategically change the operations are continuously interrupted by new problems in the daily routines: the central warranty operations are growing out of proportion as subsidiaries start sending back instruments for repairs, the cost and income reports from the activities seem almost impossible to coordinate as subsidiaries continue to develop their own routines and organizational structures for the local, technical service operations. The new, combined BTG-LKB instrument range encompasses a great variety of instruments that shall be repaired and maintained by the new, local and central service support groups.

The central Instrument Service Department lacks internal contacts. During the period 1986-1989, much time and efforts are devoted to finding an internal position in the organization, centrally as well as in relation to the subsidiaries. The inertia characterizing the legitimization process continues throughout the period. It is difficult for the central instrument service group to change the cost based Pharmacia view on technical support into a profit and customer oriented vision of the future service activities. The lack of internal contacts accentuates these difficulties.

1990: A NEW AFTER SALES SERVICE DIVISION IS BORN

The discussions in 1990 between the new, industrially oriented BTG president and divisional managers and the instrument service manager, on new directions for the technical services concern the tactics and strategies for redirecting the operations. A number of decisions are taken. Firstly, a new, formal organization structure has to be implemented; the secluded organizational position of the Instrument Service Group has to be changed. It needs to be given the status of division and shall also be represented in the strategic management group of BTG. Secondly, it is necessary to do something about the cost control and measurement tools for the service activities. The information about what is being done out in the subsidiaries needs to be radically improved. Thirdly, it is necessary to budget money for Instrument Service so that investments can be made - new

service technicians need to be employed, service contract sales people need to be trained, and more. Estimations are made regarding costs and a fixed cost budget for the service operations is decided on.

These ideas also remain within the organization after the Grisslehamn meeting where the plans for a strategic change in the after sales service activities are presented to the international subsidiary representatives for the first time. No concrete planning and implementation procedures are decided on or initiated. From August 1990, the new BTG manager takes over the responsibility for Pharmacia LKB Biotechnology, but attention is almost immediately drawn to another organizational level as Pharmacia Biosystems emerges. Changing the after sales services becomes, for various reasons, not a prioritized strategic area in this new situation.

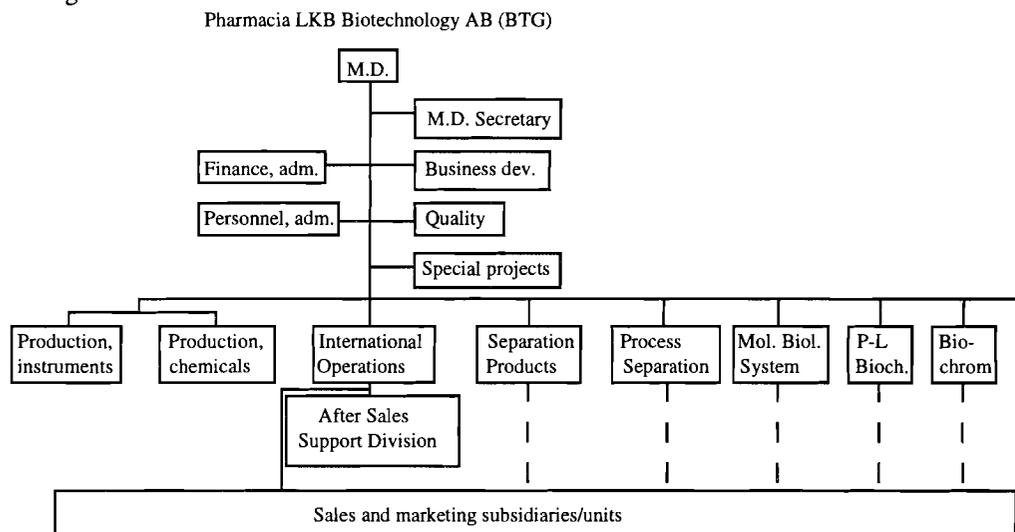


Figure 2.5. Organizational position of the After Sales Service Division

In the internal discussions that follow, it is decided that a new After Sales Division (ASD) shall be established. It signals a radical shift in the view of - and in the priority given to - the service operations and it requires the appointment of a new after sales manager. A new manager is recruited internally, from BTG's product development department. The new After Sales Service Division is officially announced in November 1990 and a central task force is formed, primarily consisting of four people: the new after sales manager, the former instrument service manager, the manager for technical support and documentation, and an external consultant. After pressures from the task force, the new after sales manager is able to participate in the BTG management group together with representatives from the different product divisions. Although in organizational terms given the status of Division, the After Sales Division is positioned under the control of another division -

International Operations Division - which is responsible for coordinating the contacts with the subsidiaries.(Figure 2.5)⁶²

In late November 1990, the new ASD manager circulates an internal information letter to the other central units and to the subsidiaries, summarizing the purpose and the priorities of the "new" function. The divisional status is stressed. It is also stated that priorities shall be given to a new area, the service contract business, from 1991 and onwards. The new service division is legitimized by referring to the changed market conditions:⁶³

The market for BTG's products is maturing, which means tougher competition. The choice of product is more based on price/performance than other values, i.e. technical support included in the product price. In this situation, differentiation is one key for success. The customers can't any longer be expected to be experts on molecule separation and therefore the products have to be more automated and user friendly. They are not purchasing a device for separation of molecules but the function of molecule separation. The need for After Sales Support is growing as a consequence. When the products become more complex they also become more expensive and demands arise for a higher level of availability as well as service to minimize down time. With complex products the customer gets more dependent on the supplier. In a maturing market it becomes more important to establish good long term relations to already existing customers. Most of our orders received are repurchase. The After Sales Support is a crucial function to keep good relations with our customers.

The potential and the competition for service contracts are described, as is an already ongoing, minor study of the UK subsidiary which due to the local market conditions already has been progressive in the development of its service business. Other subsidiaries have also developed local contract policies and operations, but the UK company is to serve as pilot study for the central ASD, and as a guideline for other subsidiaries.

The ASD's short term priorities are also presented: 1) deciding the future role of After Sales Support, 2) what service business operations to prioritize, 3) how to penetrate the service contract market, 4) what products to start with, 5) what kind of administrative system is needed for reports and follow-up, and 6) investigating the kinds of support needed by the subsidiaries from the central ASD group.

According to the task force's plans, it is necessary to start in the subsidiaries in order to implement this radical change. An After Sales Business Plan and an Action Plan for 1991 and for the 1992-1993 period have to be developed. In the introduction letter it is stated that within a few months - early in 1991 - all subsidiary executives and Service Managers in the subsidiaries will be invited to a planning meeting for the turn around of the technical service operations.

⁶²Internal Organization, After Sales Support Division, 901122

⁶³Information Letter, 901122

THE FOCAL CHANGE AREAS EMERGE; DEFINING AREAS OF CONCERN

During the four months that follow, the ASD task force group continues the internal work to plan for the changes in the after sales operations. One of the problems identified in the initial discussions concerns the choice of problem area to prioritize from among the diverse and multifold problems that can be identified. Thus, one of the problems is to decide on where and with what to start in the changing organization. All the necessary changes cannot be implemented simultaneously, given the limited resources in the central ASD to manage the change. Parallel to the strategic change, the daily routine tasks still have to be managed: the warranty problems, handling the documentation procedures, supporting the subsidiaries concerning spare parts problems, answering general questions and requests from both subsidiaries and Product Divisions concerning matters related to the instrument service, and more. Given this situation, the group decides to limit the strategic change areas to three prioritized sub-projects. None of the three projects are new, they have all emerged from prior attempts to change the after sales activities and from consequences of the decision to change a cost-based Instrument Service Department to an After Sales Service Division with profit responsibility.

Irrespective of the choice of sub-projects, the task force group acknowledges the need to work with both short- and long-term priorities. For any newly established division it is important to show to the BTG management, to other product divisions and to the subsidiaries that it "warrants" the position as Division and profit center. It is acknowledged by the group that one way to change the established, internal view of the unit - as a passive, costly support function - is to show, in profit terms and in a short period of time, that it deserves to be a recognised division. This both complements and contradicts the idea that one of the central aims of the ASD will be to establish the division as the driving force and motor for creating customer loyalty and long-term relationships with the instrument buyers and users. The three strategic changes chosen combine the need for both short- and long-term results.

Firstly, it is decided to give priority to the service contract market. In order to secure loyalty and long-term relationships with customers, the subsidiaries are to be motivated and mobilized to change their present approach and sell more service and repair contracts and to give greater attention to their long-term customer contacts. These are not new ideas within the Division. They have emerged earlier, out of concern for matching the short-term priorities of the product sales units with the customer-demand long-term service support. The marketing and product units direct attention and priorities to the first four-five years, with heavy emphasis on the sales and installation phase, until a new product is

introduced, while many customers look for more technical support after the first two-three years of use. For the technical service organization, the first years of use are mainly tied to costs: spare part supplies have to be built up, technicians have to be trained on the new products, warranties have to be handled. As service profits begin to show, it is generally time to adapt to the launching of a new product or system. It is acknowledged that the increased sales of service contracts can be a way to overcome some of these problems.

Secondly, there is concern for the variety of policies for reporting the costs for services, e.g. installations. There is a strong feeling in the task force group that a number of services are not paid for by the customers, and that many costs are transferred to the ASD. It is also necessary to look over the pricing procedures. The whole problem area of pricing and invoicing procedures is in turn linked to the variety of established policies in the subsidiaries for handling and controlling different activities and phases in the customer contacts; marketing, instrument sales, application services, installations, warranties, technical support and repurchases.

Thirdly, the work in changing the cost control system - a topic which has been the focus of the Instrument Service Manager's attempts to change the after sales unit since 1987 - is considered crucial as the Division is departing from the long established cost center tradition.

PLANNING FOR A SUBSIDIARY MEETING

Despite the general acceptance of the need for a change in the after sales activities, including support from the BTG management, it is acknowledged that it will be difficult to achieve a change in the service contacts with customers without direct contacts with subsidiary representatives. To change the character of the subsidiaries' relations with the instrument users will initially require direct contacts between the central ASD organization and the subsidiaries. And to motivate the subsidiaries to attend a service meeting will require the support from central BTG management. Coordination with the central product units concerning, for example, newly launched or future product launches, will have to wait. Attention must first be paid to the marketing subsidiary organizations.

During the turbulent years of the BTG-LKB merger, the central Instrument Service manager and technicians have successively reduced their visits to and direct contacts with the subsidiaries. The handling of warranties, organizational changes, and a successively shrinking central unit have contributed to this. A face-to-face meeting with the people in

the subsidiaries is necessary in order mobilize a change. Such a meeting is to be held in the beginning of 1991 and primary targets for a change will be BTG subsidiary executives and their service managers.

The need for better information about both end-users and subsidiaries is soon acknowledged. In order to be able to analyze the present situation - it is already a well-known fact that a number of subsidiaries are in the process of developing their contract business (US, UK, Canada, India, Sweden) - subsidiaries are asked to compile and mail information on revenues from contract sales, billable repairs, warranty costs and free services, among other things. During the first quarter of 1991, direct visits to the US and UK subsidiaries are also made by representatives of the task force group. The information is to be accumulated, analyzed and used to convey a picture of the present, overall situation. Not all subsidiaries are able to provide the information. There are strong indications of a need for both improved measurement systems and for standardized policies on how to report results. There are also indications of diffused after sales responsibilities among the subsidiary organizations' internal units. Despite the lack of comparability, a comparison of the existing situation regarding service contract sales and other things, is set up for presentation.

The lack of direct customer contacts requires the task force group to approach the central Product Divisions for information concerning customers. The new Business Development Manager of the ASD starts assembling centrally available information about customers, product use situations, type of separation problems that customers need to solve and general information about the purchasing and decision processes in different customer groups. Product Division Managers are interviewed. But the information acquired does not fulfil completely the requirements of the ASD:⁶⁴

We were speaking different languages. While I was talking about customers in terms of the various characteristics related to industrial, health care, governmental customer groups etc., they were focusing on the customers in terms of whether they were using instruments for separating large or small molecules....I had to use their terminology, but adapt it to our situation in order to make it useful. Much of their customer information was uninteresting to us. We had to accept the products they had sold and installed. We needed customer information which could simplify the analysis of what type of services that different customers could be expected to ask for.

Much time is devoted to preparing a summary and analysis of customer groups and key customers, and appropriate service products that can be provided to the subsidiaries by the ASD and by the subsidiaries. The customer analysis aims to result in a tentative description of BTG's customer groups, their general application areas, needs and consequences of instrument error, purchasing characteristics and expected service

⁶⁴After Sales Division Manager, interview(transl.), Spring 1992

requirements. With this as help it is assumed that the subsidiaries will be better able to mobilize and direct their efforts towards different customers.

The centrally developed customer analysis that is intended to support the subsidiaries when approaching the customers divides the customers into four basic groups:

1. INDUSTRY (mainly pharmaceutical companies)

Three types are distinguished:

1. Industry customers using the equipment in production/manufacturing, with a need of high up time and for which the consequence of instrument error is a considerable loss of money. 2. Industry customers using the equipment in production/ quality control, with a need of high up-time and reliable results and for which the consequence of error is a considerable delay in quality checks. 3. Industry customers using the equipment in R&D/project work, with a need of consistent and reliable results and for which the consequence of error is expensive project delays. The industrial customers are generally mature in calculating costs and have a tradition of budgeting service benefits and costs. The purchasing of services is generally delegated to production managers or project leaders who might not be the same as those buying the equipment. An important decision criteria should be, for example, the cost for consequences by error.

2. HEALTH CARE

Three types are distinguished:

1. H C customers using the equipment in clinical routine testing, with a need for high up time and for which the consequence of error is the loss of money and important one time samples. 2. H C customers using the equipment in applied research, with a need for consistent and reliable results and for which the consequences of error are loss of important samples and project delays. 3. H C customers using the equipment in basic research, with a significant need for consistent and reliable results, low price/controllable costs, and for which the consequences of error are loss of important samples and loss of convenience. As with the industrial customers the H C customers are mature in calculating costs by errors and of budgeting service costs. Purchasing is often forced by central policies but delegated to department managers. An important product decision criteria is cost/test.

3. ACADEMY

Three types are distinguished:

1. Universities using the equipment in applied research, with a need for consistent and reliable results and for which the consequence of error is product delays. 2. Science parks using the equipment in core labs, with a need for consistent and reliable results and for which the consequence of error is the loss of produced services. 3. Universities using the product in basic research, with a need for low price/controllable costs, and for which the consequences of error are product delay and loss of convenience. The Academy customers are often seen to run the project on a fixed fund. The group is generally very immature in budgeting service costs. Sometimes the money for service in the fund has to compete with the scientist's salary, etc. The fund holder or the project leader is responsible for purchases and the decision criteria is mainly "lowest possible cost".

4. GOVERNMENTAL

Four types are distinguished:

1. G customers using the equipment in routine analysis, with a need for high up time and for which the consequences of error are loss of one time samples and loss of money/test. 2. G customers using the equipment in legal proof analysis, with a need for consistent and reliable results, and for which the consequences of error are loss of one time samples and loss of reliable results. 3. G customers using the equipment in applied research, with a need for consistent and reliable results, and for which the consequences of error are loss of expensive samples and project delays. 4. G customers using the equipment in basic research, with a need for consistent and reliable results, and for which the consequences of error are loss of expensive samples and loss of convenience. The G customers are generally mature in calculating costs by consequences and have a tradition of budgeting service benefits. Purchasing is often delegated to department managers but they might be controlled by central policies. The decision criteria are often centered around cost/test.

In addition, the task force group's initial planning for the subsidiary meeting encompasses a broad, tentative analysis of the present situation concerning the installed base of instruments and how it is distributed among the four customer groups. Despite the difficulties to acquire reliable information, check lists for each of the large products/systems are developed commenting on: general instrument service characteristics, the general service competition on the products, the distribution of products in different countries/regions, total number of sold instruments, scrappage rate and new products sales/year, and a tentative presentation of each customer group's service level and price demands for the specific products.

The portfolio of information and check lists that are to be provided to the subsidiaries also encompass suggestions on how to develop accurate pricing policies. Price/performance ladders are developed and various arguments for each service level are suggested, which can be used by subsidiaries in negotiations with potential service contract customers.

In addition to providing subsidiaries with checklists and arguments for service selling, the written portfolio entails checklists for analyzing each subsidiary organization's present resource situation related to services. It is necessary to lead the subsidiaries into analyzing who in the present situation can contribute or actively engage in after sales activities: the regular sales force, service engineers, dedicated service sales persons, service/after sales manager, other BTG managers, BTG executive manager, other shared internal personnel resources, part time external resources, divisional management in HQ, product managers in HQ, subsidiary product managers, etc. Checklists for analyzing qualitative aspects of the present resource situation are also included: product knowledge levels, capabilities, motivation levels, etc.

Apart from the various checklists that are to be a help for the subsidiaries in developing and analyzing their present service activities, the portfolio is complemented with

economic and market arguments to motivate the subsidiaries to change their views of the service activities and take immediate action.

Despite the heterogeneous situation among the subsidiaries concerning the installed base of instruments and systems, the task force decides to develop arguments which direct the subsidiaries' attention to one of the four customer groups, Industrial. The argument is that the market has been observed to be changing towards industrial customer groups, using the more integrated product systems in applied research and production. It is also argued in the information and checklist portfolio that the two systems that are presently being launched, SMART and A.L.F., will be suitable objects for starting the sales of service contracts. The various support documents that might be needed (PR material, market analysis, warranty frames, legal texts etc.) and by what department they will be provided (Business Support HQ, Technical Support HQ etc.) are also listed.

In the process of finding arguments for convincing the subsidiaries to direct attention to the service activities, the task force group also decides to prepare for presentations of successful subsidiaries. A number of subsidiaries have already, on their own, developed local policies and practises for selling contracts and providing services. It is decided to use some of these subsidiaries to motivate and mobilize others into action and to spread ideas on service support. Contacts are taken with the UK, the US and the Indian subsidiaries. The UK company is invited to present its newly implemented computer based service management system. One of the fundamental problems in the subsidiary organizations is the diverse set (or lack of) policies to report internally to HQ on the service activities. There is a vague hope that the UK system might be possible to implement in other subsidiaries, and thus take a step towards standardization of service management report and control routines.

During the first months of 1991, the task force spends most of its time gathering the information, analyses, checklists and arguments which are to be provided to the subsidiaries. A number of goals for the coming meeting, for 1991 as a whole, and for the After Sales Support Operations for 1991 through 1994 are set in the internal discussions.

The objectives of the planned meeting are to familiarize those attending with the business opportunities for After Sales Support, to define the roles and responsibilities of the Division and the Subsidiaries, to work out action plans to develop the sales of service contracts, and to agree on more long-term goals.

An extensive list of subsidiary and divisional actions for 1991 is developed. It is to be presented at the coming meeting and encompasses: organize the ASD, recruit people to new positions, establish strategies and objectives, make a global business plan, develop further the contract concept, implement service contract sales, implement a new system for reporting and measuring the global after sales operations, develop new routines for return goods handling, develop standards for instruction manuals, analyse and develop new after sales services, implement a new policy for the spare part business, rationalize spare part handling, implement and follow up agreed plans, and make budgets for 1992.

In discussions with the new BTG manager it is decided that BTG top management will promise the new owners, Procordia, a certain level of increased net result for the new division for the next three years, from a negative net result due to the cost center tradition. Another objective is that revenues from contracts shall be increased by a certain percentage in the coming three years.

In March 1991, the meeting with the subsidiaries is to be held. BTG subsidiary managers, subsidiary service managers, the ASD managers, the new BTG manager and product managers responsible for the new SMART system are invited to take part in the four days kick-off meeting in Copenhagen.

THE COPENHAGEN MEETING

Representatives from sixteen subsidiaries come to the Copenhagen meeting. Eight of the sixteen organizations are represented by two persons, while the other eight have only one representative present. There is disappointment within the task force group that so few show up at the meeting. Among those present there are also some which are neither BTG subsidiary managers nor service managers, but are responsible for operational, technical service matters in the local organizations. Among those present, the BTG subsidiary managers come from a Pharmacia tradition, while some of the service managers/technicians originally come from the former LKB organization.

Participants are given presentations of the new views of the service activities, the various checklists are described and various factors motivating changed service policies are delivered. The UK, US and Indian subsidiaries are given time to present their service practices and task groups are formed among the participants for the various tasks that are to be solved, e.g. the development of action plans. The smaller task groups formed are based on different underlying objectives. Representatives of the larger, outwardly successful, subsidiaries are given the opportunity to interact with representatives of minor

subsidiaries. Subsidiaries which are geographically close are given the opportunity to interact more intensely, with the underlying hope of the task force group that local, sub-regional contacts and coordination of certain activities will continue also after the Copenhagen meeting. For the central ASD task force group, opportunities are given to sit down and discuss specific matters separately with individual subsidiaries. The subsidiaries' contacts with the central BTG manager and the Production Division representative are more limited.

The ASD task force group organizing the first international BTG service meeting also becomes exposed to a number of questions and concerns among the subsidiary representatives. For example, a number of representatives express open doubts that it will ever be possible to start selling service contracts and start charging their local customers for technical support, which by tradition has been provided free of charge by the sales, marketing and application support units. The argument is that it has always been a way of securing instrument sales. It is argued that this is the established policy among most biotech instrument suppliers and customers within their particular, local markets. The task force group becomes involved in intense discussions, using the whole range of arguments that have been developed before the meeting. However, there is a growing uncertainty whether the arguments are effective, whether they will be adopted and turned into actions.

Another problem that has to be solved concerns the underlying purpose of contract selling. There has been a suspicion within the task force group already before the meeting that the focal change project concerning the increased sales of contracts can be understood as simply a project to sell extended warranties. An increased sales of service contracts which by both the subsidiary units and the customer organizations are looked upon as extended warranties will not change the actual exchange activities and interactions. If understood in this way, the long-term goal to develop long-term relationships and presence within a group of chosen, industrial key account organizations will not be achieved - it will only stabilize the present situation, it is assumed.

Analyses show that the US and UK subsidiaries are responsible for almost 85 percent of BTG's total, present number of contracts. Figures mailed back indicate large differences - from zero contracts (Denmark, Japan) to 7229 contracts (USA). The US organization has, at least on paper, been very successful in selling contracts. However, a preparatory visit to the organization indicates that a large part of their contracts have been sold by a growing, centrally placed telemarketing unit. The task force group assumes that a large number of the American contracts are probably regarded by the customers as "insurance

contracts" - extended warranties - with no significant effect on the contacts between the customers and the subsidiary organization. At the Copenhagen meeting, it is stressed that underlying the sales goals concerning service contracts, is a need for sometimes radical changes in the local organizations and in their contacts with customers.

The Copenhagen meeting is concluded with presentations of preliminary, short-term, Action Plans and long-term Business Plans that have been developed during the four days meeting. Plans are set for future budgeting for services, for service contract sales, for sales and service training programs, for scheduling the number of appropriate customer visits and for scheduling to set off a number of days for service sales. The development of Action and Business plans is to continue in the local subsidiary organizations.

Two weeks after the meeting, follow-up letters are mailed to the subsidiaries, including those that have been invited but have not been able to attend. Once again, the significant change that is necessary is pointed to:⁶⁵

The conversion of After Sales Support from being a cost centre to a profit centre implies a change in culture for the company and demands for high attentions from all parties involved beside After Sales Support, i.e. sales, scientific support and economy and administration. To keep our focus it is essential not to split our attention and limited resources on several simultaneous activities and we have chosen to develop the market for Service Contracts first.....

In order to help the subsidiaries formulate business plans, the Canadian company's Business Plan is sent as an illustrative example to follow. In addition, the various tasks that have been decided on at the meeting, for the subsidiaries as well as for the HQ Division, are repeated. The subsidiaries are to analyze their local situations concerning needed after sales service resources, estimated needs for support from HQ, needs for field service engineer training, and they are also to complete the Business and Action Plans. Once again, information on the present situation is to be reported back to the central Division.

The follow-up letter also includes descriptions of what is next on the HQ Division's agenda. The list of actions is long. Overall After Sales Strategies and Objectives have to be established. Attention has to be directed towards the central Product Management and Product Development Groups to establish contacts to secure that future products will become service friendly and cost effective from a service point of view. In addition, the Division has to secure that there are no disturbances in the routines for supporting the global field service organizations (spare parts, manuals, instructions, training, administrative systems etc.) There are also a number of specific actions that the Division

⁶⁵Information Letter, April 8 1991

promises to take: during the spring new safety and product control regulations have been adopted in several countries, which will require significant modifications in certain instruments, standardized warranty rules have to be developed, subsidiaries have expressed an urgent need for training courses both for Field Engineers and Service Managers (i.e. on administering contract sales), specific service kits have to be developed for the newly launched SMART and A.L.F systems, service diagnostic software has to be created for future products, and standards for Preventive Maintenance need to be established. In order to increase the information concerning the actual installed base, subsidiaries shall also be provided with information concerning all products delivered to customers during the last three turbulent years.

VISITING THE SUBSIDIARIES

At the end of April 1991, the task force group starts planning for direct visits to subsidiary organizations. Influenced by the proceeding work in the Capital Rationalization Project, it is considered necessary to meet directly with some of the subsidiary organizations and establish contacts. Intense direct contacts through visits are initiated with above all, the French (May), the Japanese (June and November) and the US (September and November) subsidiaries. In addition, there are intense contacts with the influential UK subsidiary whose computer based service management system is to be scrutinized and possibly spread to other subsidiaries. The Swiss and the Canadian organizations are visited in connection with the trips to France and USA . The intention is also to visit the large German subsidiary, but a number of turbulent, internal reorganizations following from the Biosystems ventures makes it less suitable for visits. In the beginning of 1992, the German organization is approached.

One of the first and most significant experiences made by the visiting task force group is the fact that subsidiaries over time have developed very different traditions in their After Sales Operations. However, they mostly have one thing in common. For the majority of the biotech subsidiary managers, organized meetings with Divisional After Sales representatives are a new experience. The infrequent direct meetings that have taken place since 1986, involving instrument service, have mainly been between individuals at other, more operational levels in the organizations.

The central task force group puts up three basic objectives for the visits to the selected subsidiaries: to increase HQ knowledge about the stage of service development that the subsidiaries have reached, to collect good service ideas in different areas that can be spread to other subsidiaries and to increase the knowledge of what types of support are

needed, and thirdly, to influence the subsidiaries to engage in the change process and do it in a "structured" way. A standardized check-list of questions is developed.

France

The meeting with the French subsidiary representatives (the BTG manager and the Service Manager) becomes focused on a particular problem not dealt with specifically at the Copenhagen meeting, namely the links to other Pharmacia organizations and operations. BTG's Separation Instrument operations have by tradition been strongly linked to the Diagnostics operations, including that of the former LKB subsidiary Wallac. In addition, Pharmacia's acquisition of ENI (the American diagnostics company) and the integration of US based Pharmacia Deltec (infusion pumps and other instruments) are beginning to influence the European subsidiaries' sales and service operations as the instruments of these new Pharmacia companies are installed. Not all subsidiaries are able to keep separate service (and sales) resources for the different product companies. In the French case, it is above all Wallac's long and fairly stable operations in the country which put a focus on this complexity.

The Wallac business has, since the 70s, come to represent a large part of the French subsidiary's total After Sales Support activities. Thus, the support to the BTG instrument customers has to be shared between BTG and Pharmacia's diagnostics companies. In addition, the lack of application support competence in the subsidiary for Wallac's instruments has led to diagnostics application support being provided to French customers by the After Sales Service unit. Demo activities, installations and sales support have also become time consuming parts of its operations. However, as the users of Wallac's and BTG's products in some respects are similar - they are laboratory customers - the after sales unit has been able to take advantage of the similarities. The majority of the service contracts have been sold to Wallac customers.

The task force decides to try to keep the diagnostics services within the after sales unit - despite the ongoing, long-term operational disintegration of the separation instrument and the diagnostics activities and the new integration within Biosystems - due to the heavy dependence on Wallac. The idea is further strengthened by the fact that 15 large, potential contract customers in the Paris region have shown interest in signing contracts for *all* its *Pharmacia* laboratory instruments. One result of the contact with the French subsidiary is an increased awareness and acknowledgement of the fact that central contacts and negotiations with Wallac and Pharmacia Diagnostics have to be initiated as the task force group returns to the central organization.

No particular business plan for after sales services has been developed, and the French after sales unit is still strongly established as a cost center in the organization. When the task force group leaves the French subsidiary, the situation for after sales is generally characterized as being "critical" and a rapid change is not to be expected.

Japan

The aim of the visit to the important Japanese subsidiary in June is basically to exchange information - the subsidiary needs to be informed about the after sales ideas and the task force group needs information about the Japanese market situation. They also need to "establish personal contacts and relations".⁶⁶ The meeting is important not only because of the size of the Japanese market and BTG sales, but also because its representative at the Copenhagen meeting had been one of those who had expressed open doubts about the possibilities to sell service contracts. Two days are assigned to meetings with the local BTG Marketing and Sales units and with the subordinate After Sales unit. Here, contacts are taken directly with the BTG executive.

The first meeting in June gives indications that no priorities have been given to the After Sales Project after the Copenhagen meeting. Instead, discussions come to circle around information problems between HQ in Uppsala and the subsidiary, in both directions. A number of minor misunderstandings concerning product modifications, how and who to contact concerning product and service matters at HQ, the problems of incompatible PCs and EDI systems, and more, have to be sorted out.

The Japanese organization's presentation of their present situation and operations in the after sales area indicates that a strong instrument sales tradition has been established, based on relatively high prices on the separation instruments and everything else free of charge, if and when customers ask for it. The task force group has to argue strongly that if the profit center tradition is going to be implemented, it is necessary to start to charge customers for all repairs out of warranty and let the time fee for Service Charged cover the costs for After Sales, including a certain profit. However, this can only be achieved through coordination with the sales and marketing units, by starting e.g. with more differentiated pricing policies. So far, the most significant after sales effort made in the Japanese organization is a customer survey, focusing on customer requirements and on competitors' service operations. However, the results are due to October and cannot be used in the discussions of the first meeting.

⁶⁶Travel report, June 1991

The subsidiary's presentation indicates the specific situation in which the after sales changes are to be implemented: the main part of the customer contacts are handled by approximately 100 dealers of different size, most of whom are non-exclusive BTG dealers. Mainly in the case of large up-scaled separation systems, e.g. the BioProcess products, the direct contacts between the Japanese BTG organization and the users are more intense. In service matters, the dealers receive complaints from the customers, who in turn transfer the complaints or faulty product to central After Sales in Tokyo or Osaka. In case of work-shop repairs, the repaired products are then sent back to the customers via the dealers who invoice the customer. Approximately 25 percent of all services are work-shop repairs handled in this way, and over 90 percent of all activities are related to repairs in cases of product breakdowns. Thus, in the local business plan that has not yet been outlined, it is necessary to involve the distributors in contract sales. In addition, in the plans it is also necessary to acknowledge the fact that all services on the computer parts of instrument systems are performed by the computer suppliers, on separate, local agreements.

Very few customers have bought service contracts in the Japanese market - zero, according to mailed in information to HQ. Despite this, the Japanese representatives report a slow change in attitude, especially among industrial customers buying the larger process systems. The internal interest to sell contracts is found among the service managers and service technicians. After sales personnel have in fact made attempts to offer service contracts when visiting customers for repairs. It has started mainly with the up-scaled industrial BioProcess system, but efforts to offer contracts with the smaller A.L.F. system have also been made.

In addition to revising the original action plan and establish new concrete plans, a great deal of time is spent solving communication problems with Uppsala. In order to gather information about the Japanese market, the task force group also arranges short visits to distributors and customers.

During the months following the visit, the Japanese subsidiary organization is not left alone. Pressures to act on contract sales come also from the Uppsala based BTG President who has a seat in the Japanese subsidiary's board of directors. In addition, a number of the Japanese industrial customers using up-scaled BioProcess systems approach the organization for service contracts and other support services. One of the potential process system customers even sends a representative to the Uppsala organization in order to collect information on Pharmacia BTG's ability to handle long-term support activities. In the beginning of the autumn, the Japanese BTG Executive

Manager initiates contacts with the After Sales Manager in Uppsala in order to get advice and support on the service contract business.

The pressures give results. When the task force group visits the Japanese subsidiary a second time in November, radical changes can be observed. In a period of five months, the Japanese BTG organization, including the local BTG executive, the Marketing and Sales units and the After Sales unit, have initiated a number of radical changes. Apart from the centrally organized projects, a local after sales project in Osaka has been started. Two of the largest Japanese customers, who have been thoroughly investigating BTG's support structure and resources, are about to sign contracts, and the task force group visits the customers together with local BTG representatives. Locally adapted contracts and contract policies have also been developed during the period between the visits.

USA

In total, the task force group visits the US BTG organization three times in 1991. The first visit is in January, before the Copenhagen meeting, as the first round of gathering information about the global situation for after sales support is made. All three meetings with the US representatives come to be focused on two inter-related issues: the budgeting of service costs and the principles for handling service contracts, including the differentiation of services to customers. In retrospect, the task force group describes the meetings as "tough", almost stormy. Two different opinions and service principles are to be balanced and changed, and after the third face-to-face meeting in November the task force group representatives express doubts:⁶⁷

It is very doubtful whether the US organization still had faith in us and in our ideas.

The task force group's analysis before the Copenhagen meeting has indicated that the US company's share of all contracts sold is almost 75 percent. However, the local contract policies that have developed during the preceding years do not fit with the ideas that the central ASD is planning for. The US company's new service contract sales have become strongly connected with its telemarketing operations. At the first meeting in January, the task force group suggests that some kind of differentiation of the services shall be made. Behind the rapid increase in the number of telemarketed contracts - which are conceived by the task force group as being a form of "*before* after sales service" - there are no significant changes in the contacts with customers. No significant customer adaptations related to services and service support have resulted from the increased contract sales. The task force group argues that what the US BTG organization is now marketing is the

⁶⁷Interview, After Sales Manager, January 1992

right for customers to have repairs made to a certain cost - an insurance contract - which does not encompass the idea of customer adapted service operations and increased and more regular contacts with the customers.

The US organization advances strong arguments defending its ideas on the contract business. As the discussion comes to center in on the budget figures for After Sales and the fact that the budgeted cost increase for services is outweighed by the higher prices - i.e. with no budgeted volume increase in services and service contracts - the US organization points to the situation in the US market. The large group of non-industrial instrument users in academic research and governmental organizations seldom budgets for service costs. In addition, support for the arguments is found in a large nationwide study which is to cover research laboratories and organizations all over the country. The investigation suggests that R&D laboratories should avoid service contracts as these generally generate higher service costs for the user. The cost calculations in the study are questioned by the task force group, arguing that the calculations do not include, for example, the fact that large customers often keep an internal, more expensive and inefficient service unit than BTG, and that quality, security, time savings, and customer adaptation aspects are not included in the investigation.

Discussions concerning budget and customer contract policies continue at the third meeting in November and the US company agrees to look over their contract business and plan for changes that are in line with ASD's ideas. These direct contacts between central After Sales Support and Management in the powerful American BTG organizations are new for both parties.

United Kingdom

The UK subsidiary which is visited during the late summer of 1991 and in the beginning of 1992 has been generally acknowledged to be progressive in its after sales operations, compared to most other subsidiary organizations. Despite this, the task force group recognises the inertial forces that exist also within this organization. In the meetings, the task force group is able to identify a number of "service entrepreneurs" within the organization, individuals in different units who have come to recognise the business potential that is coupled to the service operations. One of these is the BTG Executive Manager in UK, but due to the rapid sales decrease experienced by all biotech suppliers and the ongoing rationalization and cost reduction programs within Biosystems, she is reluctant to make service investments with prolonged pay-offs. One of the issues centrally negotiated with the UK organization concerns the employment of a new salesman who is to be specialized on the sales of service contracts. Despite the progress made in the service area in the UK, the resources for contract sales are lacking. This bottleneck is in

turn associated with the internal tensions in the UK organization between the sales unit's established (successful) sales philosophy and the emerging importance of services.

The relative progressiveness of the UK service unit matches an equally strong and progressive sales organization. The latter's progressiveness, however, is linked to new product sales. The idea of turning service into a profit center is not accepted and welcomed by individual salesmen in the sales unit. The argument put forward by the sales unit is that it will mean considerably increased costs for the customers, with negative effects on its customer contacts. In addition, although not openly admitted, it is an established policy that the sales unit is often helped in its new product sales negotiations with customers if e.g. installations can be offered free of charge, while costs can be transferred to the service unit. One of the arguments that the service task force group can put forward to the sales unit is the fact that the most important customers often allocate sales and service costs to different accounts, and thus it will be possible for both BTG UK and the customers to compare different costs under the appropriate headings.

One outcome of the first meeting and negotiation with the UK company's BTG executive is the rather unusual promise given by the task force group and the central ASD to guarantee the salary for a new, full time employed service contract salesman in UK in 1991. The new salesman does not take on an easy task. Beside a number of initial practical problems that have to be solved regarding his position in the organization, knowledge and skills in negotiating service contract sales with, and adapting contracts to, different types of customers have to be developed. However, after only a few months, the investment begins to pay off. At the end of 1991 the new salesman has made profits on contract sales which are equivalent to four times his guaranteed salary. However, some of the internal resistance from the sales unit remains.

As a consequence of the reorganization of the biotech business, the creation of Biosystems and the regionalization project, a number of BTG managers change positions. This includes the UK subsidiary's BTG Executive Manager who moves to a new position in the new regional office for Europe in Brussels in September 1991. The new BTG manager in UK and the new personal contact for the task force group becomes a former, Dutch BTG manager.

A great deal of time is spent evaluating the UK subsidiary's newly implemented service management system. Analyses show that it is a powerful system but that if it is to be implemented in other subsidiaries it will have to be adapted to each subsidiary's specific level of development. In order to adapt to the right level of development it will be

necessary to choose a limited number of important system functions which are implemented step-wise in the organizations.

BREAKS AND AMBIGUITIES IN THE AFTER SALES PROJECT; THE NEW BIO-SYSTEMS ORGANIZATION AND THE REGIONALIZATION PROJECT

In June and July 1991, the organizational changes linked to the Volvo-Procordia deal, the creation of Biosystems, and the Regionalization Program begin to have effects. After the first meeting with the Japanese subsidiary, the task force group is pulled into the reorganization processes. While the central ASD as a whole can continue to work according to their daily routines and with ongoing change projects, the Divisional Manager becomes involved in discussions concerning the new operational Biosystems organization. The turbulence in the whole organization affects the formal structure for reporting and getting approval for planned strategic changes. During the months that follow, the After Sales Manager is involved in discussions with the newly appointed managers of Biosystems, BTG and the new organization Biosystems Region Europe in Brussels. During the organizational transition period, until the spring of 1992, leading managers also change positions, which in turn leads to a situation in which the After Sales manager has to negotiate with a number of different individuals in the new organizations. The new, emerging division of responsibilities is unclear.

For the ASD, the regionalization program is initially the cause of most concern. After sales support has been accepted as an important part of the new Biosystem Group's business activities in late 1991. As a consequence, After Sales shall also have a position and resources in the new regional office in Brussels, which is to control and support the European BTG organizations and their customers. As the subsidiaries and customers are considered by the Biosystems management to be supported best by a central unit closer to the actual, performed service operations, it is decided centrally that the Brussels office shall also have a specific After Sales Manager. Budget procedures and other important control functions in the after sales area shall be controlled from Brussels. The process mirrors that experienced by the central capital management group in Uppsala; responsibilities are spread to both Uppsala and a new regional unit in Brussels.

As a consequence of this decision, and as a consequence of the fact that no regional after sales manager for the Brussels office is actually being appointed during the rest of 1991, the central After Sales Manager becomes involved in internal discussions regarding the division of work and responsibilities in the new, emerging organization. The central task force group argues that the ongoing changes in the after sales project require them to be

able to approach the subsidiary organizations directly, for budget figures, contract sales figures, etc. This is considered necessary in order to be able to control, motivate and direct the actions of the subsidiaries towards their local customers. The requests meet with some initial resistance from the management of Biosystems and Region Europe. In order for the new organization to be implemented and settled, it is considered important that the control and reporting routines are institutionalized according to plan. The new responsibilities and functions of Region Europe need to be settled without any significant delays, according to Procordia's ambition not to prolong the process of integrating and consolidating the new Biosystems organization.

The internal discussions continue concerning the roles of the central ASD, Region Europe and the subsidiaries in Europe. However, as the process towards establishing Region Europe continues, the central ASD continues its after sales project and resumes some of its direct contacts with the European subsidiaries.

In September 1991, the newly appointed Biosystems executive for Region Europe and his local project group inform about the present status of the projects: projects are started to set up the new regional, European organizational structure, including the organization in Brussels, of which After Sales Support is one. However, the after sales support project will be started when a new after sales manager has taken up his position, due in late 1991. A concrete decision is taken that Region Europe will have the profit center responsibility for all operations in Europe, implying that Region Europe will review and consolidate budgets and forecasts for after sales services 1991/1992. A specific regional after sales project is to be started later, in the beginning of 1992, after a number of attempts to consolidate a regional project group.

Practical budgeting problems in the subsidiaries - the budgets submitted by the subsidiaries show incompatible figures - makes it unavoidable for the central ASD not to approach the subsidiaries directly concerning these matters, bypassing the regional Biosystems office. The ambiguities concerning the role of the new Biosystems organization continues throughout the spring of 1992.

THE CAPITAL RATIONALIZATION PROJECT; PLANNING FOR CHANGED SPARE PART DISTRIBUTION

The Capital Rationalization Project (CRP) has progressed for over a year when attention is directed at the spare part activities of the physical distribution. Analyses have shown that much capital is bound up in stocks of spare parts, centrally and locally. In September

1991, among all the other projects that have been initiated, plans for the spare part operations begin to take shape. In addition to the increased contacts with the CRP group, internal discussions in ASD result in a two step action plan. In the first round, "slow movers" are to be identified and stocks are to be reduced both centrally and locally. In the second round, the whole assortment of spare parts is to be reduced. The ASD manager responsible for the HQ spare part unit is made responsible for the project. The new change intervenes in the original ASD plans. Due to the strong support given to the capital rationalization program and the new focus on reduced stocks, ASD has to adapt to the new prioritized change area.

The need for more efficient spare part distribution, capital rationalization and reduced product range is acknowledged as important both by the ASD and the CRP group. Significant costs are tied to the spare part operations. However, due to a number of intervening processes for both groups, it is not until the end of February 1992 that a written plan for a specific Spare Parts Policy Project can be presented, and the first project meeting can be booked for the beginning of March. In the steering group as well as the project group, are members from BTG management, ASD and the new, institutionalized Capital Management Function. The objective is to have an approved and signed Spare Part Policy set in operation by June 1 1992.

The ambitious action plan encompasses 11 sub-projects focused on: identification of customer demands for availability, classification code systems, internal consignment and stocking location, spare part kits, routines for prognosis, ordering routines, dead inventories, parts for discontinued products, new product parts, exchange units, and pricing. Each sub-project has a responsible person, and each has a three step time table which indicates what is to be finished by the end of March, April and May. However, due to the turbulent spring of 1992 when two of the managers of the ASD task force group leave the ASD, the ambitious plans have to be revised and new time tables have to be set. The spare part change program is resumed again during the late spring.

THE LEGITIMIZATION PROCESS CONTINUES; MEETING WITH CENTRAL SUPPORT UNITS IN UPPSALA

In-between the visits to subsidiaries, during the second half of 1991, the task force group needs to establish contacts with, and inform other Divisions about, the ongoing work and the new emerging service support ideas. In some cases, contacts are taken reactively, i.e. as a consequence of the fact that organizational conditions have changed or institutionalized practices have shown incompatibility with the after sales changes that are

to be implemented. In other cases, the internal meetings are proactive and a result of the fact that e.g. product divisions need to be informed about the after sales project. The Division urgently needs to establish a more stable position within the organization.⁶⁸

Our relationships with the subsidiaries as well as with the other central divisions were very weak...

Contacts with the central economy function are intense during the autumn of 1991. Cost allocation problems due to the diversity of practices among the subsidiaries have to be solved. The internal contacts between the after sales function and the economy function intensify at the end of the year as it becomes clear that a change in the subsidiaries' way of handling their customer services - based on the prerequisites that After Sales should function as a profit center - cannot be achieved without central support from the economy function.

Another important step in the internal marketing process is the invitation in November of the central product divisions to a specific after sales seminar in Uppsala. Around 20 representatives from all the central product divisions are informed about the ongoing processes, including the aims and long-term objectives of the changes in after sales.

On the whole, ASD's contacts with central product development and design units have been very sporadic. Coordination has increased somewhat in connection with the launching of the new SMART system. However, ASD now begins to acknowledge the importance of taking part also in the early design process:⁶⁹

A more long-term aspect is related to After Sales Support involvement in new development projects to influence the design in order to optimize the number and types of spare parts to be assigned...

A number of factors related to the serviceability of the products need to be coordinated with the product development and design departments. However, other issues and problems have to be dealt with first - prioritized issues related to the customers and the subsidiary organizations.

It is also necessary to restructure the internal organization of the central ASD. In September 1991, a new, revised Divisional structure is presented by the After Sales Manager. As many of the areas within the Division have become coupled to fairly extensive changes, it is considered necessary to give each of the group managers (spare parts, service documentation, business development, return goods) an increased influence

⁶⁸Interview with former After Sales Manager, November 1992

⁶⁹News Letter, November 1991

over strategic decisions. A new central management group is established with the purpose of improving efficiency in internal communication and decision making.

THE DISMANTLING OF PHARMACIA BIOSYSTEMS AB AND AN OVERVIEW OF THE AFTER SALES SERVICE PROJECT

In the first week of January 1992, ASD presents an internal overview of the situation. In the internal letter that is sent out it is stated in the introduction:⁷⁰

The overall strategic conditions haven't changed....Overall company strategies such as TOTAL SOLUTIONS and PARTNERSHIP demand for After Sales Support as a necessary tool to be accomplished. After Sales Support is also a necessary resource when managing KEY ACCOUNTS. The industrial market segment is therefore the most important.

However, many of the conditions are changing and so are some of the after sales change processes. In addition, revisions in the action and time plans also have to be made. As main operational issues within the nearest planning time frame are now listed the following:

- to market and sell service agreements/contracts
- to market both internally and externally the service concept and contract business idea
- to set a new pricing and logistics policy for spare parts
- to review the subsidiaries' pricing of billed services

Not mentioned in the summary, but still given a high priority in the internal work of ASD, is the ongoing work to establish new routines for, and standardize, the economic report and allocation policies.

The listing indicates that two new priorities have been added, the internal marketing procedures and the work together with the Capital Management Function for improved efficiency in spare part distribution. As to the first added priority, there is a growing concern within the task force group that the ideas need to be more firmly implanted within the other central units of the organization. The other priority is a direct effect of the Capital Management Function having now reached the stage in the distribution change process when something has to be done about the high capital costs bound up in spare parts inventories.

In the report, the latest situation within the subsidiaries is summed up in terms of their respective knowledge about the business opportunities for after sales services and about its importance to the BTG operations. The general evaluation indicates that:⁷¹

⁷⁰Information Letter, January 1992

⁷¹Internal Reports, January 1992

...some subsidiaries have a fairly good understanding of their market and opportunities for After Sales Support. Among these are UK, Canada, Australia, Switzerland and India. For the rest, additional work has to be done to achieve the proper level...

In order to achieve this, the strategic operations of 1992 are to include sales training and setting up of proper business plans for USA, Japan and Europe, except UK and Switzerland.

In the present situation, a number of risks related to the service contract focus are also acknowledged. The subsidiaries still experience difficulties in projecting the actual business opportunities in services in their local markets, and they often have a poor financial coordination and control of these operations which jeopardizes attempts to make reliable income and cost statements for the contracts.

Based on the situational analysis and the acknowledgement of a number of new, necessary changes in the after sales operations, a new, revised and extended list of specific change areas and project plans is presented for 1992:

- Reduce the number of spare parts by 50%
- Install computer based system with 24 hour access from subsidiaries
- Continue the just started implementation of the UK service management system
- Focus on training and skills of service technicians and managers
- Introduce a flatter organization locally and centrally to improve collaboration in the divisional operations
- New procedures for the logistics of the important instrument manuals
- Initiate time studies in services to make efficiency evaluations
- Arrange common central facilities for ASD to improve coordination
- Start implementation of a quality program, based on the new ISO 9001 rules
- Complement sales training with customer satisfaction courses
- Improve the overall human resource management, for all levels of the ASD

Plans for six sub-projects are presented:

- To set up a task force project for internal and external marketing of the service business, with the aim to link ASD with Product Marketing and Sales
- To set up a project to improve skills, and overall personal quality in the after sales services
- To set up a project for spreading and implementing the UK service management program
- To set up a project group to set the rules for economic calculations, budgeting and financial reporting
- To set up a project for special sales training of Service Managers
- To set up plans for getting the commitment for the after sales support concept in subsidiary top management.

In addition, all parties involved in after sales are also to await changes in the After Sales Support structure as the new organization in Region Europe is decided on and established; the dismantling of Biosystems and the renewed start of the regionalization program have not yet influenced the continuation of the after sales project. Most of the listed change areas and projects are to be accumulated and dealt with in the planning

procedures, coupled to a new international After Sales Meeting. In many respects, the responses from the subsidiaries to the important issues outlined at the Copenhagen meeting have not been satisfactory. While some of the subsidiaries eventually have started to show radical results - e.g. the Japanese company - there is a number of subsidiaries which have been slow to act.

The revised plans and the development of the process to change the after sales operations during the latter half of 1991 and the beginning of 1992 is related to changed conditions according to the analysis; there has been a number of organizational changes which have been adapted to, the distribution project has changed the conditions for allocating distribution costs, the organizational changes are coupled with changed allocation rules, etc. In addition, there have been changes in the plans and operations of Biochrom and Wallac - partly increasing the ambiguity concerning the future positions of the two companies - which have increased the need for establishing routines for how the services performed by BTG on their products should be organized and controlled. During the Biosystems venture there have also emerged ambiguities concerning what contacts to establish with Biosystem companies in need of after sales support, but with limited resources: Biosensor in Uppsala and Pharmacia Deltec in USA.

In sum, an ambitious new program for the continued development of the after sales operations is presented. Coupled with this, there is a remaining uncertainty concerning the development out in the local markets. Fourteen of the subsidiaries have not provided reports on service contract sales for 1991, and eight of the subsidiaries have not given any reports on services charged.

MAKING PLANS FOR TWO NEW INTERNATIONAL MEETINGS

Despite the uncertainty concerning the ongoing processes, the task force group decides that it is time to arrange new after sales meetings, now focusing more intensely on the European organizations. During January-March 1992, plans emerge and preparations are made for two new seminars. The interest for, and the subsequent effects of, the first Copenhagen meeting have not been altogether satisfactory. In an internal letter to central and local units, it is stated:⁷²

Unfortunately, the previous seminar held in Copenhagen in March 1991 and further launching activities have shown to be insufficient to establish the After Sales Support business in Europe and to get it running smoothly and profitably in all of Europe. We have therefore decided to relaunch the whole concept of After Sales Support in Region Europe.

⁷²Information Letter, March 1992

The ideas behind the new ASD have been implanted among subsidiaries and in product divisions, but actual changes in attitudes and actions are limited to a few actors. The task force group needs to repeat the activities of the first conference, motivating the participants to change attitudes and routines for their service support. In addition, it is necessary to take it one step further and adapt to a number of new situational factors, e.g. the new regional market organization, and the new start of this project in Europe.

The situation analysis presented internally, including the motives for investing in After Sales Support, is to a large extent the same that has been presented on prior occasions: a "new business is created through good long term customer relations", the service organization contributes "by affecting customers' evaluations of BTG", the profit opportunities are there, and proactive service support could increase the possibilities for better planning and thus increased efficiency. The UK, US and Australian subsidiaries are now among those put forward as good examples, concerning different aspects of the operations.

However, the official situation analysis also points to a number of areas for improvements. The skills for selling service products are not developed with one or two exceptions (e.g. UK), there is generally no steering of sales efforts for service products in most subsidiaries, resources for fulfilling undertakings in after sales services are scarce, the "cost center culture" is still dominating, the awareness of customers' needs for added value are generally low, the organization in Region Europe has still no resources to develop the service business in the local subsidiaries, skills and systems for business and sales planning and follow-up are lacking, the tasks are not optimally distributed between local and central organizations, incentive systems are lacking, and general management support from central, regional and local management on all levels needs to be strengthened. In the motivations for a relaunch is also included the fact that in the recession period now entered, after sales support is "a necessary mean for survival".

The strategy for the new meetings is in many respects revised compared to the approach chosen for the first Copenhagen meeting. In addition to a development group - which encompasses the responsible task force group - the After Sales Manager forms a special Control/Reference Group. The group consists of the After Sales Manager, the central BTG Executive Manager, and managers from the new Region Europe. A stronger management support is needed and information must to be transferred continuously to responsible or affected managers.

While limiting the plans and the meetings to only the European organizations this time, plans are now to engage more intensely 23 representatives from the subsidiaries and from the regional organization and 7 representatives from central divisions in Sweden. The American and Asian companies will be approached at a later stage. Several of the latter are already *relatively* successful; in Canada, USA, Australia and Japan efforts are made to stabilize new routines for after sales.

The meetings are to be strongly inter-connected. That is, the task force group attempts to increase the continuity in the contacts with all counterparts in the program, between the different meetings. Especially the subsidiaries shall be made to commit to the performance of certain steps of action between the meetings.

The detailed plans for the meetings and the continued work now focus on two important aspects of the after sales work. Firstly, strong emphasis is now put on the fact that after sales development shall be a *cooperative venture* involving customers, subsidiaries, regions and central divisions. Secondly, the internal actors shall be given tools and motivations for increasing their efforts to differentiate between customers. That is, business development in after sales shall have as starting point the already installed base. All units shall be given insights into the economic advantages of keeping existing customers and in the costs associated with losing existing customers. Tools for keeping so-called key accounts shall be developed - ideas coming from the now rapidly proceeding regionalization project. The key customers' purchasing and maintenance routines shall be analyzed in order to be able to develop long-term marketing and sales strategies adapted to their activities.

In the new plans that are developed, the official objective is to develop "profitable business results for Customers, Subsidiaries, Regions and Central Divisions"⁷³. The need for a systemic focus is specifically stressed. The meetings are to take the participants through five planned steps. Firstly, a platform has to be created where the participants gain insight into the advantages of generating business results in cooperation. Secondly, in addition to understanding the positive results, actors need to be engaged in the actual process of cooperative business development, including the choice of key account customers. Thirdly, actors need to be given an introduction to strategic marketing, including the differentiation of marketing strategies for key customers and for customers which only need a basic service support. Fourthly, the next step is to develop an understanding of marketing strategies for the key accounts, including the choice of key accounts, the analysis of their purchasing and maintenance operations, the development

⁷³Internal Plans for ASD, March 1992

of targeted offers and the handling of customer relations. The fifth step is to be a continuation of step four, including practical advice and training in managing key accounts.

Plans are that the first meeting shall be concluded with the setting of five types of action plans for the overall Service Project Europe, including project coordination plans for the Central Functions, for the Region, for Subsidiaries, and action plans for the Individuals involved in the project. Certain actions are to be taken between the meetings, and actors shall be able to present progress reports at the second meeting.

The second meeting is to be focused on the development of sales plans for service contracts and key account management, and shall be concluded with detailed action plans for 1992. As a preparatory task for the first meeting - and as a way of increasing the central service group's information about local conditions - subsidiaries are asked to send in detailed budget, profit&loss, and sales accounts, descriptions of the organizational and resource situations (local relations between Pharmacia LKB Biotechnology, Pharmacia BioProcess, Diagnostica, Wallac, ENI, third party actors etc.), and suggestions on how functions shall be organized within the subsidiaries and the new Region Europe.

A number of already implemented processes - and processes to implement already planned changes - parallel the planning for the relaunch program. Thus, during the first months of 1992 the central ASD is involved in the processes for trimming the spare part stock, trimming the 24 hour computer based bulletin board, installing and trimming the PC-based management system from UK, and developing training programs for service technicians (sales and technical training) and for service managers (management and business, including financial controlling). In addition, details for the implementation of a quality program, adapted to the ISO 9001 standards are being developed. External and internal marketing of the after sales concept continues. This includes HQ's persistent marketing of the three original priority areas: service contract sales, the review of the pricing of services and improvements of the economic reporting routines.

REVISION OF MEETING PLANS

The general recession and the need for internal rationalizations influence the opportunities for ASD to implement the new program according to plans. Central management negotiations are started during the early spring of 1992 which results in 100 people having to leave the central Uppsala organization. One of these is the central After Sales Divisional Manager who has been leading the task force group. Later during the spring, a

new central manager is appointed internally. The new manager is a former LKB manager with experience from working in management positions in foreign subsidiaries and presently engaged in the build-up of the new Capital Management Function.

The plans for the coming After Sales meeting which is to be held in Brussels have to be revised. New time tables have to be set.

Despite the revised time plans and disturbances due to the exchange of people in the central ASD management group, two meetings are held, in the late spring and in the summer of 1992. The remaining task force group has learnt from the mistakes of the Copenhagen meeting. The Pharmacia Biotech President appointed in August 1990 participates in the first Brussels meeting, stressing the importance of the after sales operations to the participating subsidiary/branch office managers and the local sales and after sales managers participating in the big, well attended meeting. When leaving the Brussels meeting, the task force group describes it as "a big success, at last". Local managers have been committed to the new tasks, and have been strongly oriented towards one focused task; to develop the service contract business. The after sales change is also assumed to gain momentum in the autumn, when the Regionalization Project's new key account activities and associated local reorganizations are expected to gain speed. The local after sales support units' organizational positions are expected to become clearer as the new, local key account organizations, which shall bridge the gap to the customers, begin to take shape. The after sales units will have a much more obvious role to play in this new situation.

The second meeting is much smaller and involves mainly the local contract salesmen from the local sales organizations and the local after sales managers. Details concerning the practical steps in the process to start selling contracts can be sorted out.

For the first time in years - despite remaining inertia in some of the local branch offices and organizational ambiguities in Uppsala and in Brussels - a momentum seems to appear towards the end of 1992 in the process of implanting a revised view of the technical service operations.

Towards the end of 1992, the new start of the after sales changes comes from ongoing processes in other parts of the organization. The implementation of the UK organization's service management program is supported by the ongoing changes and standardization of the European EDI system, related to both hardware and software systems. The distribution and logistics change, in turn, is an important underlying driving force for the

EDI change. The organizationally rather withdrawn central and local after sales service units come more into the limelight as a result of the ongoing changes in the regionalization process. Internal contacts between the after sales units and the sales, marketing and the product development and production units are slowly improving. Standardized service report routines are emerging in the beginning of 1993, improving the opportunities for the central ASD to continuously monitor improvements or deviations in service contract sales and cost control. The sub-regionalization program supports the reduction of local service resources, establishing slimmed sub-regional service operations. The problems in the after sales service activities which had started after the announced merger between LKB and BTG in 1986 seem to be over at last. There is light at the end of the tunnel.

3 Preceding the Radical Reorganization: A Merger Process 1986-1989

During the course of 1986, and without any profound experience of company acquisitions and fusion processes, Pharmacia acquires three established companies: AB Leo (Sweden) in the pharmaceutical area, Intraocular Inc.(USA) in the ophthalmology area and AB LKB Produkter (Sweden) in the separation equipment area. In addition, 83 percent shares in the medical instrument firm Deltec (USA) are acquired, joint ventures with Alfa-Laval in Sweden and with Chiron Corporation in the US are established, a cooperation agreement in the diagnostics area with ENI (USA) is signed, and a number of other, minor cooperation agreements are signed during the same year.¹ In addition, Pharmacia starts a research company in LaJolla, USA, Pharmacia Genetic Engineering. The three large acquisitions are announced within a period of six months at the end of 1986: AB Leo the first and the largest deal, Intermedics the second, and LKB the third and last acquisition at the end of the year. Altogether, the acquisition costs are estimated at over 5 Billion Skr, increasing the size of Pharmacia by 50 percent.

A long company merger process, affecting especially Pharmacia's separation instrument and diagnostics operations, sets the scene for the marketing change episodes and other important changes from 1989 and onwards. The strategic changes in the distribution and logistics activities, in the organization of the international marketing organization, and in the after sales service activities, that are initiated around 1989, are born from the merger of the Pharmacia company BTG and the second global Swedish biotech supplier, LKB Produkter. Three years before the merger, in 1983, LKB's owner, Incentive, had taken

¹A detailed list of Pharmacia's alliances and acquisitions 1980-1990, are presented in the Appendix

the decision to decrease risk levels and improve profits. Companies with a higher risk and high capital costs, like LKB, became potential objects for sale.

Pharmacia had been in contact with LKB with a view to acquisition on two earlier occasions, with the most serious attempt made in 1978-79. For various price and owner related reasons the deals were never concluded. LKB was not the only prospect for Pharmacia's Biotechnology Group (BTG). A number of other potential buyers had also shown interest in LKB; Astra, Alfa-Laval and other European and American companies. Like Pharmacia, LKB has also made a number of acquisitions during preceding periods.

The merger of LKB's biotech and diagnostics operations with those of Pharmacia takes place in a year during which a number of externally oriented changes radically transform the Pharmacia corporation.

The fusion between LKB and BTG becomes beset with problems. The actual merger process is undeliberately extended over several years and some of the effects are still noticeable in Pharmacia's marketing activities in the beginning of the 90's.

THE OBJECTIVE OF THE MERGER AT THE OUTSET: CREATING A NEW, DOMINATING INTERNATIONAL BIOTECH SUPPLIER

In the autumn of 1986, LKB's owner, Incentive, starts looking for a buyer of the company. As the company has been moving towards systems selling during the course of the 80s, successively complementing the traditional instrument business with separation media, there is also a need for major investments in a new chemical plant. In addition, LKB has also made a number of acquisitions which has lowered the equity/assets ratio: for example, in the beginning of 1986 LKB acquires 38 percent of the shares in the French company Sebia S.A., a manufacturer of clinical electrophoretic instruments and diagnostic kits. The first step towards a planned, deep cooperation venture in the molecular biology area are also taken a few months earlier as LKB signs a contract with the American biotech supplier IBI. During the first half of 1986, cooperation ventures with Hitachi America Ltd. in computer programs for DNA sequencing and with Gelman Sciences (USA) in gel products and gel production technology are also initiated.

There are, however, obvious similarities between LKB and BTG at the time of the acquisition - similar technologies, a concurrent, increased external expansion, high global market shares.

Pharmacia presents a number of reasons for acquiring LKB which differ from those of the latter. The long-term strategy developed in the early 80s still governs Pharmacia's strategic actions. That is, officially the idea is to form a strong position in the biotech supply business and to create a biotechnology based drug and diagnostics product development program, and which together are to create a competitive advantage based on reduced time for product development, among other things.

Officially, five motives for the merger are advanced.² Firstly, there is a growth motive. Together LKB and Pharmacia will have almost a 50 per cent market share world wide in the two central separation techniques electrophoresis and chromatography. This will make the new company the market leader in a situation where sales growth is beginning to level out and new Japanese and American competitors are appearing on the stage. Secondly, despite the obvious product overlaps in both chromatography and electrophoresis, it is generally assumed that LKB's strong position in instruments and BTG's long tradition in chemicals are complementary. Both companies are in the process of developing a system-oriented biotech business and the merger will speed up this process. By joining R&D resources, a number of synergies will be accomplished and the potential of competitive new product development programs can be realized, it is assumed. Thirdly, positive scale effects can be achieved in manufacturing. Fourthly, the companies have almost totally overlapping global marketing systems and by keeping the established local positions and identities, i.e. maintaining dual sales channels in the short and medium range time perspective, it will be possible to defend the market shares and maintain customer relations. In a later stage, cooperation in sales and distribution will probably lead to important synergies, it is assumed. Lastly, the merger also involves activities in the diagnostics area. Here, the overlap in the two companies' activities are insignificant. By tradition, Pharmacia has developed a position in the allergy field with its own companies for marketing diagnostic tests. LKB with its Finnish subsidiary company Wallac, has developed a strong position in instruments for immuno-diagnostics and has just launched its new test package Delfia. Wallac and Pharmacia Diagnostics have also had some minor collaborative ventures during the three years preceding the merger.

Despite the obvious similarities and product overlaps in the two companies in 1986, the official motivations for the merger are based on the assumption that a number of scale effects can be gained, and complementarities can be realized. Competition between the two companies has changed over time. In the 70s and early 80s, LKB regards Pharmacia BTG as an archrival in electrophoresis, but this changes and at the time of the merger it is mainly in chromatography that the companies are competing for the same customers. The

²Joint press release, 1986-10-09. p. 3

complementarities are related also to marketing activities and customer groups; while LKB has developed a strong position in the instrument business among academic research institutions, based e.g. on a well-developed technical service support organization, Pharmacia BTG has become well-known for its know-how in the separation media area and for its (academic) application service support. Furthermore, BTG has during the 70s and 80s approached industrial customers for the sales of up-scaled process instruments, a group which LKB in the 80s is beginning to approach.

INITIAL MERGER STRATEGY

In December 1986, preliminary merger plans and a general strategy for the whole integration process are presented. A plan divided in three parts is presented to the two companies: the Orientation Phase (December-86 to March-87), the Decision Phase (January-87 to June-87) and the Accomplishment Phase (encompassing a period of two to three years).³ In the strategy plans that are decided on in December 1986 the principal idea is to integrate the two organizations in a specific order: Production, R&D, Administration, finance and economy, Personnel and information, and lastly, Central marketing and Local sales organizations. The strategy is based on the assumption that interferences and disturbances in the sales activities shall be minimized. Both BTG and LKB have high market shares and have long been the main competitors in many local markets, each with an average 20-25 per cent market share. If the integration process is not handled right it is acknowledged that it will lead to a loss of market shares and customers. Profit margins in the biotech business are still fairly high in 1986, and a loss in sales is difficult to compensate by short-term cost reductions, it is assumed.

In the official integration strategy it is stressed that the acquisition shall be regarded as a common, offensive action with important long-term effects. These are as important as the immediate short and medium term synergies that shall be realized. The joint BTG and LKB biotech business operation is to grow as fast as the total market for biotech at the time, around 10-15 per cent per year. In order to avoid unnecessary disturbances in the ongoing sales routines of the two companies, the integration needs to be carefully planned, implemented and organized. As the immediate synergies are most easily observed in the diagnostics area, integration will be quicker here than in the more multifaceted biotech instrument area. Discussions between the companies' management groups and preparations during the autumn of 1986 result in the conclusions that LKB

³Wallberg, H. and Wallberg, C., *The Acquisition of LKB in 1986*, MBA Thesis, Uppsala: Uppsala University, April 1991

shall maintain its identity and its own sales companies in the initial phases and that all of LKB's long experiences from international, laboratory equipment sales shall be acknowledged and utilized in the new, large biotech organization.

Seven work groups are formed for the integration process: Research & Development, Production, Central Marketing & Sales, Administration & Economy, Personnel & Information, Diagnostics, and Bioprocessing. As BTG has no separate, central subsidiary function the responsibility for the subsidiaries is taken by the corporate management. With the help of 40 employees from both companies, the Managing Director of Pharmacia becomes responsible for the integration process. In addition, external consultants from the Indevo organization are brought in. They remain six months in the organization. Towards the end of 1986, after a number of analyses have been performed, a definition of the new, formal organization is presented. Pharmacia managers are appointed for most leading positions in the new functional organization. The first reports from the initial meetings in the work groups are to be presented in the middle of December 1986.

LKB BACKGROUND

When LKB-Produkter AB is founded in 1943 as a reconstruction of the research laboratory in Stockholm, Forskningslaboratoriet LKB, it is decided that LKB is to produce scientific instruments, and to some extent also fine chemicals, on an industrial basis for researchers and others, in close cooperation with the Physical-Chemical Institution (Department of Biochemistry) at Uppsala University. From the outset, the strategy is to develop and manufacture instruments for separation of molecules through sedimentation, electrophoresis and chromatography. The first instruments are to be based on the University-developed ultracentrifuge and electrophoresis techniques. LKB will thus spring from the same origin as Pharmacia BTG, from a cooperation with Uppsala University.

During the 15 years that follow, LKB successively builds up an international marketing network that will form the foundation for the stable sales increase during the period. In 1984, two years before the merger with Pharmacia BTG, the fifteenth sales company is established, founded as LKB(Japan) Ltd:

1959	USA
1963	the Netherlands
1964	Great Britain
1966	Sweden

1967	Denmark
1967	Austria
1968	Italy
1970	Finland(via Wallac Oy)
1970	Soviet Union (LKB-Pribori AB)
1971	France
1971	Belgium
1972	West Germany
1982	Switzerland
1984	China
1984	Japan

The successive build-up of an international, marketing subsidiary net will to a large extent mirror that of BTG. Apart from the sales subsidiaries, there are by now in the 1980s also a number of so-called Sales Support Offices all over the world which function as contact offices with resources for marketing and service support for agents and distributors.⁴

The successive extension of the marketing organization coincides with the expansion of the production units, in a successive growth of the main production unit in Bromma outside Stockholm and through company acquisitions. The first and most important major acquisition and merger is performed in 1970 when the Finnish diagnostics and analytical instrument company Wallac Oy is integrated in the LKB organization. Wallac soon becomes an important mainstay for LKB's operations and expanding product range, increasing the diversification of instrument techniques. Within the product group Clinical Systems (responsible for around one third of total sales in 1985), Wallac is responsible for immuno-diagnostic systems for biochemical research. During the last years before the merger with Pharmacia, Wallac's systems and instruments for diagnostic tests emerge as one of the LKB corporation's most important growth areas. A number of new techniques in the area of immunology, biochemistry, microbiology and ecology come out of the R&D operations of Wallac during the years preceding the LKB-Pharmacia merger.

A second big acquisition in 1972 of the German company BioCal Instrument GmbH results in yet another international expansion of the production organization. The German company's British subsidiary, BioCal Instruments Ltd.(later renamed LKB Biochrom Ltd.) has production units which over time become specialized in manufacturing instruments for amino acid analyses and so-called spectrophotometers which are used e.g. for quality control in the pharmaceutical industry. The German unit of BioCal Instruments is transferred in 1977 to a joint venture (LKB Clinicon AB) with Boehringer Mannheim GmbH. LKB's engagement in this venture is terminated in 1980. BioCal Instruments Ltd. remains and becomes a subsidiary of LKB, LKB Biochrom Ltd, with

⁴The number of contracted, independent agents and distributors grows as LKB becomes more and more internationalized. In the middle of the 80s, agents and distributors in more than 60 countries supplement the subsidiaries in countries where sales are still too limited to justify wholly owned sales subsidiaries. The LKB subsidiaries contribute around 80 percent of total sales.

10 percent of LKB's total sales volume. As a result of the two mergers, LKB internationalizes its production, coordinating manufacturing operations in Bromma, Turku and Cambridge.

The innovative and entrepreneurial character of LKB's operations results in the emergence of a large number of different products and techniques applied in several different science areas. This means that LKB's products and techniques become applicable in four interrelated scientific areas: biochemistry (chemistry applied to materials of living organisms), analytical chemistry (the science to quantitatively and qualitatively characterize tests), biotechnology (the use of micro-organisms for routine production) and clinical-chemical analyses (analytical chemistry applied to clinical problem areas). As the four science areas together relate to a very large number of disciplines and application areas, LKB's products are being used in a growing number of research areas and applications during the 70s and 80s: for example, in allergy research, bacteriology, biology, biomedicine, cancer research, cell biology, ecology, enzymology, pharmacology, gene technology, histochemistry, immunology, clinical chemistry, microbiology, pathology, protein chemistry, forensic medicine, vaccine research, plant physiology and virology. In the areas of biochemistry and the emerging biotechnology, LKB's techniques and methods become applicable to most steps in the so-called "life processes".

In addition to the fact that LKB emerges as an innovator and entrepreneur in many method areas, there is also a constantly growing number of products and product variants in the product portfolio. In the beginning of the 80s, from the middle of 1980 and 18 months ahead, over 30 new products or product variants are introduced. Altogether, these new products have a share of over one third of the company's total sales during the period. The rate of new product introduction remains high, while the degree of product standardization remains on a fairly low level.

Despite the fact that LKB is becoming active in several product and method areas, compared to the main competitor Pharmacia BTG the large majority of LKB's customers in the 1980s are still found among various research institutions and clinical laboratories. Industrial customers applying upscaled versions of biotech instruments are few due to the fact that process scale instruments are relatively newly developed in the company in the early 80s.

During the years preceding the LKB-Pharmacia BTG merger, a number of inter- and intraorganizational changes in LKB lay the foundation for the integration process. The

acquisitions of Wallac and BioCal Instruments in the beginning of the 70s is followed by a number of interrelated changes both in the internal organization and in the external contacts. Two main product divisions with three product lines each emerge; the Division for Research Instruments (laboratory equipment, ultramicrotomy, biochemistry instruments) and the Division for Analytical Instruments (instruments for molecular, nuclear and clinical analysis). Some of the most marked changes in LKB at the time of the merger concern two interrelated processes: the intensification of the company's external orientation and the increased attention to the internal operational efficiency.⁵

ONGOING PROCESSES OF CHANGE IN LKB AT THE TIME OF THE MERGER 1986

The ongoing change processes which shape LKB's emerging intra- and inter-organizational structure at the end of 1986 are coupled with intensified technological changes, reflected in changing products and technique areas:

-During 1985, after some years of fluctuating sales in the electrophoretic area, LKB increases its sales by 32 percent. The company is steadily defending its position in electrophoresis - with one third of the world market for electrophoresis instruments and more than half of the market in some European countries - through the launching of new systems developed in cooperation with Columbia University in USA. The increasing importance of DNA separation, as opposed to protein separation, affects LKB's product development, but the company is basically defending its position in the area in which it started in the 1940s.

-In chromatography, LKB attempts to develop a position in the very competitive and rapidly expanding HPLC area (High Performance Liquid Chromatography). The company is in the process of building a position in HPLC for biochemical applications, while keeping the position in the stagnating LPLC area. The chromatography products continue to be important, contributing one third of total sales. LKB is also in the process of building a basis in chemicals and reagents. In comparison to some of its competitors, e.g. Pharmacia, LKB's experiences in internally controlled chemical and reagent production are relatively new.

-In 1985, LKB's Finnish subsidiary Wallac is defending the company's position in clinical systems. A newly launched system (the DELFIA diagnostic kit) is generally expected to give LKB a stable position in immuno-diagnostics for clinical laboratory customers. Wallac continues to defend LKB's niche position in the area of routine analyses.

-The areas of spectrophotometry, amino-acid analysis (LKB Biochrom's product areas) and microtomy (LKB-Bromma) are maturing and the markets for the products in these areas are not growing as fast as the products in the other, biotechnological areas. However, through cooperation ventures, during the years preceding the Pharmacia merger, LKB has begun to move into the area of molecular biology. Although the range of products still is extensive, LKB starts to focus, during the end of the 70s and the early 80s, on two important product areas: biotechnology with the separation products and diagnostics with the Wallac products.

The major intra-organizational changes that are implemented during the 70s and the early 80s are of different types. Three major production units are established in Bromma,

⁵The main steps in the processes that shape the intra- and interorganizational LKB structure and affect the LKB-BTG fusion process are summarized in the Notes at the end of the chapter.

Turku and Cambridge. The first two are steadily expanding, mainly as a result of increased investments in chemical production. R&D resources are being adapted to meet a new market situation, which means that R&D activities and resources are grouped under the increasingly more customer oriented, central Product Divisions.

In 1985, just before the merger with Pharmacia BTG, LKB begins the implementation of one of the most radical internal reorganization processes since the 70s. The reorganization of the global marketing network - a regionalization project - is started in 1986, a few months before the merger. Other ongoing change processes in the marketing network are related to the specialization/divisionalization which has started earlier in many sales subsidiaries, to the rapid internal growth of single sales subsidiaries resulting from the sales growth, and to the coordination and integration with central HQ activities, aiming to improve efficiency and central control.

LKB's experience from rationalization programs is steadily increasing. During the 80s, the intraorganizational coordination efforts are directed at improving the coordination between units responsible for instruments, chemicals, application programs and services. In short, LKB is moving through three stages of organizational adaptation during the first half of the 80s: from an organization based on techniques (electrophoresis, chromatography, microtomy...), to product orientation (instruments, chemicals,...) to a more openly market and customer driven organizational adaptation.

As regards the interorganizational change processes, a number of alliances and agreements are signed during the 80s, increasing LKB's product systems orientation. LKB has been lagging behind its competitors in some areas of chemicals and reagents. The company has developed a strong position in instruments and services, but is lagging behind some competitors in the development of chemicals/reagents and applications. As regards LKB's customer counterparts, the process of approaching industrial customers is intensified during the 80s, but the traditional customers - academic and clinical laboratories and minor research and governmental test organizations - still dominate. The process of handling sales through wholly owned sales subsidiaries and sales support offices is continuously accentuated.

Stagnating sales during the 70s has forced LKB to implement various types of capital rationalization programs and has also given the company experience in working more closely together with suppliers of raw materials and lego components. These rationalization efforts continue during the 80s. Despite a number of minor cooperation agreements, the process of establishing joint ventures and alliances with competing/

complementing suppliers of instruments - e.g. with Gelman Sciences and Hitachi - does not have time to significantly impact LKB's activities. The cooperation agreement with the American gel producer, Gelman Sciences and the acquisition (38 percent) of the French clinical instrument manufacturer Sebia S.A. are just being concluded as the merger with Pharmacia is announced.

THE MERGER PROCESS; IMMEDIATE REVISIONS OF MERGER PLANS

The process of merging LKB and Pharmacia will turn out to be complicated - the original merger plans are revised several times during the process. One important revision concerns the order in which the different units are merged, another revision concerns the time schedule for the merger process. An important source of merger problems is the fact that the marketing subsidiaries start integrating much faster than is originally planned, and without centralized control.

The original plans that are presented in late 1986 stress the importance of keeping separate marketing subsidiary nets for Pharmacia BTG's and LKB's instrument sales. The aim is to integrate the marketing activities and organizational units of the two systems successively over a longer period of time, and initially, keep distinct LKB and Pharmacia profiles in order to minimize sales loss during the merger process. In practice, this means that production, R&D and economy/administration activities and units shall be integrated first while the integration process of the international marketing networks is to be extended over a period of 2-3 years. The actual outcome of the process proves to be almost the opposite; the integration of the marketing subsidiaries starts almost immediately, while the process of integrating production and R&D units, for different reasons, takes much longer than originally planned.

PRESENTING A NEW ORGANIZATIONAL STRUCTURE

In February-March 1987 the new general, joint organization plans for the home organization and for the marketing subsidiaries are presented.(Figure 3.1.)⁶

A functional organization for the home organization is chosen. The integration of the separation product and biotech divisions and the integration of the diagnostics divisions are to be handled more or less separately and the latter are to be merged the whole way

⁶Wallberg, H. and Wallberg, C.,*The Acquisition of LKB in 1986*, MBA Thesis, Uppsala: Uppsala University, April 1991, and *Oss Emellan*, No 1, 1987

from R&D out to the sales units. Hence, the two companies' diagnostics activities in all sales subsidiaries are to be integrated immediately and parallel to the merger of the diagnostics production, administration and R&D units. The new division is named Pharmacia Diagnostics AB.

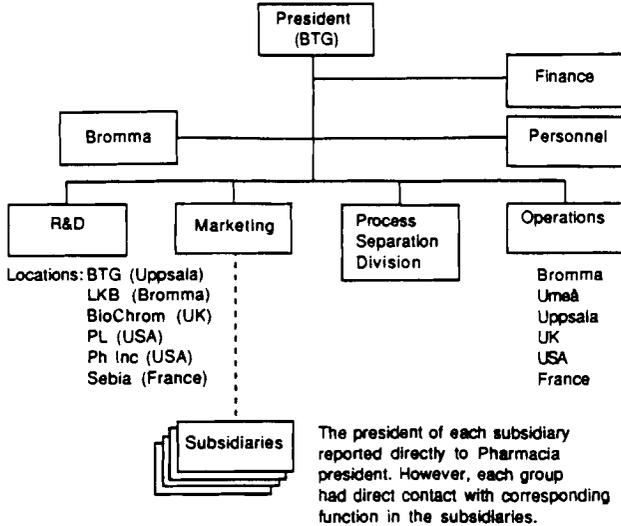


Figure 3.1. New BTG-LKB functional organization structure 1987

Apart from the central support functions, five new business areas are set up: Allergy, Immunodiagnosics, Microbiology, Analytical Instruments and Microtomy. Wallac's important DELFIA system is to be integrated with Pharmacia Diagnostics' business area Immunodiagnosics. Wallac's division for Analytical Instruments remains a separate division within Pharmacia Diagnostics, while the two companies' microbiology activities are merged. LKB's traditional microtomy activities are kept separate and are only marginally affected by the merger processes.

In the case of the biotech divisions, things are considered more complicated. Pharmacia's Biotechnology Group and LKB's Research&Industrial unit are to be merged from the base, starting from the central home organizations, far from the local markets and the customers:⁷

In the local markets, we shall - as long as it is motivated from a marketing perspective - keep separate sales channels in relation to our customers. In order to handle this dual organization, a local coordinator will be appointed in each market. His task will be to report back to the central marketing organization. If there will be a need for further resources to handle administration, economy or marketing locally, these will be added.

⁷Oss Emellan, No 1, p.1

It is decided that integration must start with the central production and R&D units in order to avoid product and research overlaps. No new products are to be launched before a thorough analysis has been performed regarding costs and revenues.

The different BTG-LKB project groups that are formed and which have responsibility for merging the different central functions (Economy/Administration, Personnel/Information, R&D, Central Marketing and Production) begin their work during the spring.

THE SUBSIDIARIES START TO MERGE

In retrospect, several answers and explanations will be advanced as to why the original plans to wait with involving the marketing units in the integration process are revised. One explanation relates to the economic and administrative control system. Already during the first quarter of 1987 the Economy/Administration project group starts incorporating the 16 LKB subsidiaries in Pharmacia's established economic and accounting system. LKB's subsidiaries have been used to act independently in relation to central headquarters, but under a very strict profit responsibility. Every foreign LKB market subsidiary has its own local board, both to support and to control the work of the local subsidiary executives. The local boards are also responsible for recruiting a new executive. The philosophy during the 80s is to create decentralized subsidiaries with stable, local contacts.⁸ Prices, for example, are always negotiated. In contrast, Pharmacia has developed a system based on product responsibility world-wide for the central product units in Uppsala, which means that the subsidiaries in general have been looked upon centrally as the product units' own, local representatives in the various markets. Profit control systems and capital efficiency routines and traditions have not been a dominant part of Pharmacia's internal administrative development. In reality, Pharmacia's market subsidiaries have also developed a tradition to act fairly independently in relation to central management, but not based on an extensive profit responsibility. The signals that are sent to the LKB subsidiaries during the spring 1987 are that they now are to adapt to Pharmacia's established administrative system. In other words, they are no longer acting under the rules of strict profit center control.

At a meeting in Uppsala in February 1987, the Managing Directors of Pharmacia's and LKB's subsidiaries world-wide meet to discuss the integration of the marketing and sales organizations. It is stressed that the integration of the almost completely overlapping

⁸Detailed descriptions of the philosophy underlying the LKB management's control over the foreign market subsidiaries and subsidiary management is presented in Ek, T., *Våga, Växa, Vinna - Ledarskap för mindre företag*, (Chapter 6), Ekerlids Förlag, Stockholm, 1994, pp. 76-78

marketing subsidiary nets - BTG and LKB both have marketing subsidiaries in the major local markets - is now to start, in small steps, without affecting the daily sales and marketing routines.(Table 3.1.)⁹

Geographic location	Subsidiary		Sales Office		Agent	
	BTG	LKB	BTG	LKB	BTG	LKB
Australia	x					x
Austria	x	x				
Belgium	x	x				
Brazil			x			x
Kanada	x					x
China		x				
Denmark	x	x				
Finland	x	x				
France	x	x				
Great Britain	x	x				
India			x	x		
Italy	x	x				
Japan	x	x				
Hong Kong			x	x		
Holland	x	x				
Norway	x					x
Switzerland	x	x				
Singapore			x			x
Spain	x					x
USA	x	x				
(West) Germany	x	x				

Table 3.1. The overlapping BTG-LKB subsidiary nets (Sources: Wallberg and Wallberg 1986, annual reviews (Pharmacia and LKB) 1980-1986)

Contrary to plan, the change process that follows the meeting during the next months, is characterized by a steady acceleration of the merger activities, however without any direct centralized control or involvement. For central management in Uppsala it is difficult to hold back and control the process when local management in the subsidiaries speed up the process. It is reported that many of the LKB subsidiaries experience the integration process as a hostile take-over and during the six months that follow, the M.D.s of thirteen of LKB's sixteen subsidiaries leave the organization.

Irrespective of whether LKB's and Pharmacia's subsidiaries are located in the same or in different geographical regions, LKB's subsidiary resources are in most cases transferred to the local Pharmacia organization. In some regions, for example in Belgium (June, 1987), announcements are sent out that LKB's sales subsidiary has been closed down and all contacts have been taken over by the local Pharmacia subsidiary. Instead of successively educating and training the two companies' sales people, service technicians and sales leaders on the former competitor's products, as has been decided in the original plans, LKB's resources and business activities are in many countries completely

⁹Wallberg, H. and Wallberg, C., *The Acquisition of LKB in 1986*, MBA Thesis, Uppsala: Uppsala University, April 1991

transferred to the Pharmacia offices and organizational units.¹⁰ As a result, reports to the central organizations in the middle of 1987 indicate that many of LKB's sales people are leaving the organization. It is reported to HQ that some have already found new positions within competing companies in the local markets.

It is also difficult to convert remaining personnel - BTG and LKB personnel - to begin to market also the former, main competitor's products. Some minor rationalization effects are reported as marketing support units in the two companies start to merge, but this cannot compensate the loss of sales personnel that results from the accelerating merger process. The damage proves difficult to repair in those cases where LKB has built up stable customer relationships, in many markets founded on the operations of a large technical service support organization. In those cases where customers have been using both Pharmacia's and LKB's supplies, it is somewhat easier to repair the damage.

The reduction in sales is made even greater by the fact that the general sales euphoria which biotech instrument suppliers in general have experienced 1980-85 is dampened in 1986. It is acknowledged that a number of LKB customers are lost during the first year of the merger; how many is not and will never really be known. The formal administration of customer accounts is taken over by the Pharmacia subsidiaries, but initiatives and efforts to analyze customer effects and to reapproach lost customers are left to the initiative of each single subsidiary. The general levelling of global biotech sales accentuates the situation. In order to reduce uneasiness among customers, announcements and written explanations for the merger are sent out, both from the central marketing offices and from the local subsidiaries.

The loss of sales and service personnel during the initial merger process is to some extent compensated by the employment of new sales and service representatives. Hence, in the subsidiaries the new product and customer portfolios are handled in 1987 by a mixture of LKB, Pharmacia and completely new sales and service personnel. Instead of keeping separate sales channels, the new biotech company - named Pharmacia LKB Biotechnology - is set to handle a global marketing organization with a mixture of LKB, Pharmacia and completely new operational resources, but heavily dominated by former Pharmacia principles, routines and traditions.

Another complicating factor in the merger of the subsidiaries concerns the links between the biotechnology units and the other sales units, especially the diagnostics units. The

¹⁰In one case, in Sweden, joint sales resources are located at LKB's Bromma offices in 1987. Three years later, the Swedish sales company moves into wholly new offices, separate from the Bromma and Uppsala organizations.

LKB subsidiary organizations have generally mirrored the mother organization in Bromma. There has been a clear division into sales units for the biotech separation instruments and for the clinical instruments, e.g. for diagnostics. Although Pharmacia has kept a product-line based marketing organization, the same type of division into BTG and Diagnostics products has been established. In addition, Pharmacia has also the separate divisions for Pharmaceuticals and for Ophthalmics (the eye surgery products).

The process of merging LKB's and Pharmacia's biotechnology and diagnostics units in each sales region is not unaffected by the way local resources for the two business areas have been previously combined in the two companies. Despite the emerging specialization in the two companies of biotechnology and diagnostics operations, overlaps exist in sales and service resources, for example. LKB's service technicians often handle both separation and diagnostic instrument services, especially for the clinical laboratory customers applying both types of instruments. In some countries - in France, for example, where LKB-Wallac's sales of diagnostic instruments is successful - the merger process is complicated due to these types of marketing resource overlaps. In some BTG subsidiaries, biotechnology and diagnostics have been kept together physically in the same premises, in others they are since long also physically separated.

Officially, the integration of LKB's and Pharmacia's sales subsidiaries is terminated during 1987 and the M.D. of the new biotech company, Pharmacia LKB Biotechnology, announces in 1988, that the merger of the sales organizations now is nearly completed. However, many of the practical problems of coordinating the activities and stabilizing new routines remain. In 1988, the long and demanding process of recruiting, educating and training new sales people starts, in order to solve the problems of reduced sales which is a result of sales people leaving the company. The actual merger processes and the results of the mergers in the different countries are affected by the fact that the subsidiaries - at the outset and in the new integrated companies - are heterogeneous as concerns internal organization structures and market positions. The emerging results of the fusion processes in each particular market remain to a large extent diffuse and unknown to the HQ units in Sweden. Some of the results can be measured in terms of lost market shares. The combined shares in the electrophoretic and chromatographic areas steadily decrease during the years that follow the acquisition. This can also be a consequence of the fact that parallel to the merger process, strong competitors (some of them new) begin to appear in the biotech supply business. However, there is a "general feeling" in the new company that the merger so far has in fact affected the customer contacts and loyalties negatively.

The integration of the *central marketing support units* in 1987 is founded on the results of the initial situation analysis concerning products, markets and customers. It is decided that the organization shall be divided into four market support divisions: Standard Chromatography, High Performance Chromatography (HPLC), Electrophoresis and Molecular Biology, thus, according to technique areas. There is also a separate division for the large scale chromatography business, named Process Separation, which initially is organized separately and parallel to the other, more closely linked, laboratory product divisions. In the middle of 1987, the five product divisions' central marketing support organization together consist of around 100 people.

The central division-of-work processes that are initiated encompass activities and resources for marketing support to the local marketing units, including marketing support materials, planning, technical and application service support, and central education, course and seminar support for marketing and sales personnel and distributors. The responsibility for the central, strategic marketing of LKB Biochrom's products is also to be located to Uppsala. Depending on the characteristics of Biochrom's products, responsibilities are divided among the central HPLC, Molecular Biology and Electrophoresis Divisions. Instrument service is to be handled by the Cambridge organization, but some of the central coordination responsibilities are taken over by the new, central Instrument Service function located in Uppsala.

A completely new marketing support function, Pharmacia LKB Biotechnology International AB, is established in October 1987 to support a number of minor or distant markets: Latin America, Israel, Portugal and India, including also a Middle East Sales Support Office in Athens. The new central unit is given the difficult task of supporting subsidiaries, sales offices and agents in the different markets. Pribori, the central LKB unit responsible for the Soviet market, is located in Bromma. During 1988, Pharmacia LKB Nordic, also with offices in Bromma, is created with the aim to coordinate the biotechnology business in the Nordic countries. Initially, it also includes the responsibility for Wallac's diagnostics activities.¹¹

Towards the end of 1988, it is officially announced that the new Product Division organization has been implemented. The chromatography unit is located in Uppsala while the central electrophoresis and molecular biology units are to be situated in Bromma.

¹¹Three years later, in January 1990, the central BTG management group presents completely new support organizations for the Bromma based units - Pribori, Nordic and International. It is decided that Pribori with responsibility for the Soviet market is to be closer linked to the Vienna based sales company for Eastern Europe. Nordic is divided, with Sweden setting up a completely new Pharmacia LKB Biotechnology sales office outside Stockholm. The rest of Nordic and International are restructured and remaining stocks and warehouse resources belonging to the two marketing support units are moved to the central distribution unit in Uppsala.

Two years later, in 1990, as a result of a number of reorganizations, all central product divisions are located in Uppsala.

MERGING THE PRODUCTION UNITS

Another important reason for the reverse order in the integration process, with limited central control of the local marketing organizations, is that the central organizations in Sweden have to direct attention to the complex processes of integrating the biotech production, R&D and central administration units. The fusion problems result in and set the stage for forthcoming changes in the physical distribution activities.

The internal group responsible for the production integration project becomes occupied with the problems of coordinating two production philosophies and a number of geographically dispersed production units. The process also includes coordination with the changing marketing organization, and the links to the new emerging R&D organization, its projects and product portfolio. Contributing to the complexity of forming a new production organization is the rapidly levelling out of the almost unbroken sales increase since the 70s. The overcapacity that already exists in the new production operations, still marginal in the beginning of 1986, is increasing.

It is estimated that Pharmacia at the time of the merger is running at 80-85 percent of its production capacity in the instrument production. By tradition, Pharmacia has developed and manufactured almost every module of the instruments in its own production organization, purchasing raw materials and using original equipment manufacturers as suppliers in only special cases. LKB on the other hand, with a long experience of "industrialized" mechanical engineering and production, is in the process of changing production policies in 1986. The company's experience from fluctuating sales has resulted in a number of capital rationalization projects since the 1970s, and plans have been outlined to cut production costs by increasing the use of OEM suppliers and increasing the efficiency of internal assembly operations.

As concerns chemical production, experiences in the two companies are different. While Pharmacia has a long tradition in developing and producing chemicals, reagents and accessories, LKB is just in the beginning of building up internal chemical production, alternatively increasing the use of external alliance partners. LKB is in need of production plants for chemicals. It seems - at least on paper - that in 1986 the two companies complement each other in certain obvious ways.

The new, joint Pharmacia LKB Biotechnology organization now encompasses five major production sites in Cambridge (LKB Biochrom/instruments), Bromma (LKB/instruments and chemicals), Uppsala (BTG/chemicals), Umeå (BTG/instruments) and Milwaukee (Pharmacia P-L Biochemicals/chemicals). In 1988, as a complement to the Umeå production operations, an instrument assembly plant is opened at Söderhamn in Sweden. LKB-Wallac's production operations in Turku are separated from LKB's biotech activities and is coupled to the process of forming a new Pharmacia Diagnostics organization, encompassing also Pharmacia's former diagnostics operations in the allergy and immunodiagnosics fields, and the small, French LKB connected company Sebia in clinical electrophoresis. LKB's microtomy operations in Bromma - with a product line which has existed since 1953 - are initially transferred to the control of Pharmacia Diagnostics AB and are later, in October 1987, sold to the UK corporation Cambridge Instruments Co. Plc. A contract is signed with the new owner on continued production of microtomy instruments for another 18 months.

The integration of the purchasing activities, the production operations and the storing and distribution functions in the new biotech division turns out to be most complicated in the case of forming a new structure for the Bromma, Uppsala and Umeå operations. Biochrom's operations are also included in the planning, but are less involved in the actual restructuring process.

The preliminary results of the meetings 1986-87 in the Production Project Group indicate that the instrument production at the sites in Bromma, Umeå and Cambridge should continue, but efforts to improve efficiency and scale economies might lead in the long run to an increased specialization. There are no indications that LKB's chemical media (gels) production in Bromma will have to be closed down, despite Pharmacia's advantages in this area. Gels and other chemicals that cannot be exchanged should also be produced in the future at LKB's Bromma plant, it is stated. Although efficiency and rationalization aspects shall be in focus, it is put forward in March 1987 that the transfer of production resources shall be in *both* directions, between the different BTG and LKB production sites. There are worries among the 170 people employed in the LKB instrument production that it will be difficult to integrate the partly overlapping production operations in Bromma and Umeå. LKB's representative in the production project group, the former manager of the whole LKB-Bromma Division, resigns in April 1987.

During the second half of 1987, contacts between Bromma and Uppsala are intensified, but no major changes are achieved. In the beginning of 1988, the first major setback for the Bromma production operations is experienced. Cambridge Instruments' subsidiary

Reichert-Jung has given a preliminary promise in December 1987 that the microtomy production shall be reduced over a period of 18 months. These plans are revised at short notice. Orders for instruments from Reichert-Jung's customers has dropped and it has also become obvious that the company needs more time to train and educate their sales people on LKB's microtomy instruments. The new plan set up is to conclude the deal already before the summer 1988, which means that LKB is left with overcapacity in the Bromma production unit. The original plans to successively transform the production operations and supply the biotech separation instrument divisions with modules and components have to be revised. The unexpected overcapacity in Bromma can only partly be offset by an increased coordination with the Umeå factory. Bromma is able to keep up some of the production by supplying Umeå with minor parts and paintwork, which in turn means that Umeå's local lego production and supplier contacts in these areas are effected.

Discussions on the division of work between Bromma and Uppsala concerning production as well as R&D and central marketing continue and are intensified during the first half of 1988. Problems accumulate as former LKB personnel leave the company. In the production operations and in other units it is generally being spoken of as a "brain-drain" process. Despite the promises given by the new biotech management group in the spring of 1988 that the rental contracts for the LKB premises will be prolonged another five years from 1990 and despite the formal decision taken to continue Bromma's gel production for the electrophoresis instruments, a number of unsolved problems concerning the production operations remain. However, it is announced officially in March 1988 that the new LKB-Pharmacia structure now is basically set and the integration process can now be considered as over.

During the spring of 1988, a number of new, comparatively large, investments in test equipment for the electronics production and supplies for mechanical components are made in the Bromma factory. The official biotech production program "Produktion 90", which is initiated in 1988, focuses on efficiency and rationalization improvements. It is stated in the program that priority shall also be given to integrating production closer with marketing and sales. The production organization is to improve the support to the marketing organization in four areas: improved product quality, reliability in deliveries, reduced product costs by capital rationalization, and increased flexibility in the production of new products and product variants. In order to achieve this, priority is given to the reduction of lead times, from the placing of the order to the point where the product is ready for distribution. From the level of 21 weeks, plans are to reduce lead times to 17 weeks at the end of the year and reach the level of 15 weeks in 1989. The need for

innovations in everything from the choice of suppliers and quality control to capital rationalization in all areas of the production is stressed. One step in the process is the appointment of a new Operations Manager for the Bromma plants and the introduction of a new formal organization. The new efficient production organization is to be supported by the new, integrated computer based administration system for the Biotechnology Group and by the Economy and Control Division for the Group, now located near the Bromma production operations.

In June 1988, as a consequence of Pharmacia BTG's investment in a new factory at Söderhamn, cable production and the assembly of fraction collectors are transferred from the Bromma factory to the Umeå-related Söderhamn operations. Fraction collectors assembled at Söderhamn are to be taken back for quality-control in Bromma. The same month, the stocks of slow moving finished goods and parts in Bromma are transferred to the central warehouse in Uppsala. In August, the ordering and shipping departments, and the rest of the Bromma inventories, move to Uppsala. In September, it is announced that Pharmacia's newly established Indian company, Pharmacia United Ltd, is to assemble instruments. The Bromma factory is to provide components and initial support during the build-up phase. During the autumn of 1988, plans are developed for extensive modernizations of the partly vacant premises in Bromma. In December, a four month renovation and rationalization program is presented.

In the fusion process, Bromma becomes more and more focused on electrophoresis production as the new common R&D organization takes shape. Production of components for the new Biosensor venture in Uppsala for the Diagnostics Division and for the Process Separation Division is also included in the revised plans for Bromma. Concurrently, Umeå takes over responsibility for chromatography instrument production. No major changes in production in Uppsala, Cambridge and Milwaukee are made.

In January 1989, Pharmacia acquires Elvac AB, supplier of glass columns to LKB since 1959, . Plans are set to move this production to the new factory at Söderhamn.

In February 1989, the inaugural meeting for the first common LKB-Pharmacia HPLC/FPLC product strategy is held in Bromma. The new products in the so-called DfB ("Designed for the Biochemist") synergy program are to be manufactured in the modernized LKB premises. Product overlaps in the former LKB and Pharmacia product lines have been minimized. In March, there are signs of improved use of production capacities in the Bromma plant, despite indications of another bad year for the whole biotech instrument industry.

In the end of May 1989, a new organizational structure for the Biotechnology Division is presented. For Bromma this means that a new Product Division for Electrophoresis and Molecular Biology Systems is created with production, R&D and Marketing units with global responsibility concentrated to the old LKB premises in Bromma. A new operating manager is also appointed. The two other instrument divisions (HPLC and Process Separation) and the Molecular and Cell Biology division (mainly chemicals) are located to the other production units. The new operating manager stresses the importance of establishing good relations and coordination with the instrument related production operations in Cambridge and with the complementary chemical production unit in Milwaukee. An important task for the new product division is to continue rationalization in production, based on a continued rationalization and integration of the product programs.

As a result of the reorganization and specialization of production and marketing units, the molecular biology and electrophoresis units in Uppsala begin to move to Bromma's electrophoresis units in October 1989, to form the new Electrophoresis and Molecular Biology Unit. Internally, the new combination of the two former divisions is given the name Biomac (Division Biomolecule Analysis and Characterization).

In November 1989, the complaints from the market subsidiaries abroad on deliveries begin to accumulate in Biomac's production operations, despite the fact that Pharmacia LKB Biotechnology's total sales volume is stagnating. The reason for delays in the supply of instruments and a rapidly increasing production volume in Bromma - from a situation of overcapacity just a year earlier - is the fact that the Bromma unit has not had time to adapt. It is now to produce a large number of electrophoresis and molecular biology products, to begin to prepare production for the new Biosensor unit in Uppsala, to manufacture certain products for the Diagnostics Division, and adapt production to the beginning success of the DfB product and to the launching of A.L.F., a completely new DNA sequencer instrument. Prior to this situation, rationalizations during 1989 have decreased the size of the production unit and the increased use of lego suppliers has not helped to speed up the supply of instruments to the subsidiaries abroad. In November, a new Managing Director for the whole Pharmacia LKB Biotechnology Group is appointed and fresh changes in the production system are initiated. Both improved coordination between production units, including R&D, and improved integration and coordination with the foreign marketing units are stressed as crucial priorities. In December 1989 - in connection with the announcement of the large Volvo-Procordia deal - the new Managing Director states that one of the main priorities for Bromma, in order to avoid another year

of disturbed or even lost sales, is to re-establish the lost contacts and information exchanges with the local marketing subsidiaries.

Despite the priorities given to other production programs, Bromma manages to supply, for the first time, components to Biosensor's assembly of the new biosensor instruments in Uppsala, in January 1990. In March-April decisions are taken to transfer the production of the new, electrophoretic, Pharmacia developed, PhastSystem from the production unit in Umeå to Bromma. This is expected to function as compensation for the reduction in the production of the Diagnostics Group's so-called "AW 96" products in Bromma and which are set for launching during the coming year. In June 1990, this is changed, as decisions are taken together with the Pharmacia Diagnostics Group to let Bromma handle the production of their newly developed instrument, the so-called CAP Processor. At the same time, among the many rationalization projects that are discussed in the middle of 1990, emphasis is put on the need to further increase the use of component suppliers and lego producers, combined with a change from a high degree of internal manufacturing to assembly activities.

In June, Pharmacia LKB Biotechnology Sverige, the Swedish sales subsidiary, moves from Bromma to new offices outside Stockholm. Biomac's internal organization in Bromma is divided into four product segments during the same period, for more focused R&D, production and marketing.

In September, as a result of decreasing sales in both the Biotechnology and the Diagnostics Groups, and after several months of internal analysis of the production organization - including analyses of the present and future product and product application areas - the new so-called Biosystems Group is introduced, as a direct result of the Volvo-Procordia deal. The new Managing Director for the Biotechnology organization signals the launching of a new production organization. In October, Biosystem's decision to reorganize the production activities is announced. The decision is to move all instrument and chemical production operations from Bromma to Uppsala and Umeå, starting immediately, in the autumn 1990. Only some minor work shop activities, run and owned by former employees, are to remain in Bromma. The whole restructuring process is to be coupled with a continued rationalization in product programs and increased component standardization. What is left of the former central LKB operations in Bromma is moved or closed down. On the first of July 1991, there is a final closure of the Bromma operations.

MERGING R&D UNITS, PRODUCT PORTFOLIOS, STOCKS AND ADMINISTRATIVE ROUTINES

Linked to the process of merging the marketing and production organizations are the processes of merging product portfolios and stocks, including storing and distribution procedures, and the large R&D units. All units have to adapt to a number of old and completely new administrative routines and information exchange systems.

One of the main reasons given for the merger in 1986 is the fact that LKB and Pharmacia BTG, despite the increasing competition between the two companies, manufacture complementary product ranges. Both companies, like other competitors in the field, have successively emerged as system suppliers, providing laboratory and industry customers with instruments, chemicals and accessories, application services (education, method support and so on) and technical services (spare parts, repairs, etc.). However, it is generally acknowledged that the two companies have developed different capabilities in these four areas. On paper, the two companies obviously complement each other, despite some overlaps: in 1986 LKB is an "industrial manufacturer" with competitive positions in instruments and technical services, while the academic, R&D-oriented Pharmacia organization has come to focus on a wide spectrum of chemicals and reagents and a large application service support organization.

Merging the two instrument portfolios proves to be a difficult task. In addition, the new integrated product portfolio - broadly consisting of LKB's 140 diversified instruments and Pharmacia's 15-20 instruments - needs to be adapted to the merger of the ongoing and planned product development projects in the two organizations. The merger starts during a period of rapid introduction of new instruments. However, in 1986 there is also a sudden drop in the sales of biotechnology supplies, affecting most manufacturers in the area. At the same time as having to handle a merger of product portfolios and R&D projects - without losing pace and without losing customers in the marketing and sales activities - the new organization almost immediately has to take on the important tasks of rationalization and capital cost reduction.

An important underlying factor which has motivated Pharmacia's acquisition of LKB is the need to extend the R&D resources. The niche that Pharmacia and LKB to a large extent fill world-wide requires large investments in R&D. The rapid technological development within the growing biotechnology field requires a rapid development of new instruments and supplies to support the technological advances. The growth motive and

the motive to increase dominance over competition are not openly stated as important reasons for the fusion.

As regards R&D, both companies are considered to be on the frontline within both chromatography and electrophoresis. However, during the first half of the 80s, LKB has mainly launched a large number of modified versions of existing instruments while BTG has been handling research and development with a more open product system oriented focus.

For the joint project groups responsible for analyzing the R&D situation in 1986 (the Research & Development Group) and the product portfolios (basically handled by the Central Marketing Group) it is not an easy task to analyze the overlaps in customers, products, techniques, and R&D projects and when they complement each other. A large number of internal meetings within the project groups, including product managers, central marketing and R&D personnel from both companies (mainly Uppsala and Bromma based), take place from the start in December 1986, throughout 1987 and even in 1988.

One rough estimation of the overlap in the ongoing R&D projects and in R&D resources in the beginning of 1987 - from a LKB perspective - indicates that in one third of the projects there is a total overlap with the projects in BTG.¹² One interpretation of the situation by BTG's R&D Managing Director in the beginning of 1987 indicates patterns in the R&D overlap.(Table 3.2.)

Product area	Relative competence BTG	Relative competence LKB	% overlap of LKB's R&D in each area	% of LKB's total R&D in each area	% overlap of LKB's tot. R&D
Liquid chrom.	4	4	40-50%	40%	20%
Separation media	5	1	70%	10%	7%
Process chrom.	4	1	100%	5%	5%
Electrophoresis	3	4	low	25%	-
Mol. Bol. instr.	2	3	low	20%	-
Mol. Bol. chem.	4	1	0%	05	-

(1=very poor, 2=poor, 3=medium, 4=good, 5=very good)

Table 3.2. R&D overlaps (Source: estimations by Wallberg and Wallberg 1986, p.24)

In order to create a new, common R&D organization and project portfolio, the R&D integration group organizes a number of meetings and internal discussions, mainly involving the R&D units in Bromma and Uppsala. The message from the Pharmacia LKB Biotechnology management group is that it is important not to lose pace in R&D activities. It is considered important to stay on the frontline and provide the marketing

¹²Wallberg, H. and Wallberg, C., *The Acquisition of LKB in 1986*, MBA Thesis, Uppsala: Uppsala University, April 1991, p.24

subsidiaries with new products and systems. Concurrently, for the future the new integrated R&D organization shall direct efforts to the development of integrated systems; instruments, media, accessories and methods. (No particular comments are given on the technical after sales services which by tradition have been handled mainly by the local subsidiary units).

In May 1987, the new biotech group's R&D manager in Uppsala presents a number of guidelines for the R&D organization and operations. The strategic guidelines for the future given to the five R&D units in Uppsala, Bromma, Cambridge, Piscataway and Milwaukee are that it is now necessary to increase the knowledge of customers' activities, to work in project form but increase the contacts between project groups and R&D centres, to keep up the technological competence e.g. through stable contacts with academic and basic research, to support an "entrepreneurial atmosphere", and to improve internal communication exchange. While the coordination between projects with overlapping technologies must be improved, it is also stated that the R&D project groups need to work out a new Long Range Plan which takes into consideration what ongoing products shall be terminated and when remaining short term projects are expected to be finished. A decision is taken in the middle of 1987 that most ongoing projects shall be continued during the rest of the year according to plan. At the same time, separate priority lists are made for the projects in Uppsala and Bromma. High priorities are given in Bromma to projects on HPLC pumps, chromatography software, new UV detectors, HPLC amino acid analyses, and other electrophoresis projects. In Uppsala, the ongoing project on large scale chromatography (the BioPilot™ system) is given the same high priority.

During 1987, it is generally acknowledged that the five R&D centers shall remain and that relocation of projects will start at the earliest in the middle of 1988. One reason is that a common R&D organization has to be introduced first, based on project groups and a new central coordination unit. In addition, LKB's and BTG's project routines (from idea to finished project) have to be standardized and coordination routines with the central marketing and production project groups have to be worked out.

As the long range plan for 1987-1990 is drawn up early in 1987, highest priority is given to the completion of ongoing projects in order to minimize short- and medium term losses. This, in turn, means that no complete new organizational structure can be presented. The process of reducing the project overlaps starts. In the liquid chromatography field there are overlapping projects that are repositioned to systems for separating small molecules and peptides, and to systems for separating large molecules

and proteins. In the separation media program, BTG's dominating position leads to most of LKB's media program being discontinued. The same applies to the area of large scale chromatography. For electrophoresis and molecular biology projects only minor adaptations are necessary.

The process of creating a new R&D organization takes longer than planned. The continuous information sent out during the first 18 months of the fusion process, indicates the problems of integrating the two hundred and thirty Bromma and Uppsala researchers in a new R&D organization. The goals directing the integration connect to the needs 1) for adaptation to the central market divisions, 2) to make a clearer division of responsibilities for operative R&D activities and long-term R&D, 3) to increase efficiency in the project groups and 4) to the needs to create *one*, united organization of the two former R&D units.

On 1st September 1988, the new R&D organization is presented. Broadly, the new organization consists of a central management unit with responsibility for coordination, control and strategic issues, and two departments for media and instruments. Each of the two blocks are in turn divided into five project units (HPLC, Process, Standard, Electrophoresis, Molecular Biology) mirroring the new central, product based, market organization. In addition, in each block, 3-4 special managers of technology are given the responsibility for certain technical areas: separation media, biochemistry, chemistry, electronics, software, mechanics, and systems. During 1989, as a result of the decision to move the electrophoresis activities to Bromma, the specialization into the four groups intensifies, but the main part of the new, large R&D organization becomes located to Uppsala. As LKB's former Bromma activities are successively reduced, the electrophoresis development projects are also transferred back to Uppsala.

One of the practical problems that has to be handled during the remainder of 1988 concerns the introduction of a common *information system* for planning and economic control of R&D projects. LKB's powerful ALBERT system is to be introduced in the new R&D organization by the end of 1988. This process, in turn, is affected by the planning for and introduction of a completely new and integrated administrative information system for the whole BTG organization. The so-called PLIIS system (Pharmacia LKB Integrated Information Systems) is a modified version of LKB's LIIS system and is planned for successive implementation between 1988 and 1990.

The new integrated information system is to take the new Biotechnology Group a step towards becoming an industrial, distribution and product flow oriented organization. In

one of the first presentations of PLIIS in the spring of 1988, it is described as consisting of - in its final version - four integrated parts; DDS (Direct Distribution System), EKOS (Economy System), MAS (Marketing Administrative System) and PAS (Production Administrative System). The aim is to implement a customer/market oriented system based on rational, efficient, service oriented and totally integrated distribution flows. The successive integration of all organizational Pharmacia LKB Biotechnology units is the final goal, starting with DDS by linking central distribution units with those of the subsidiaries world wide. In the implementation process, capital rationalization and improved cost efficiency in distribution are considered to be crucial. The interplay between DDS and EKOS is also emphasized at the outset. They are to form the heart of the final, integrated information system. During the 1990s - by linking the production and marketing units to the system - it is assumed that the company will be able to take a step towards customer order based production with a high degree of direct distribution.(Figure 3.2)¹³

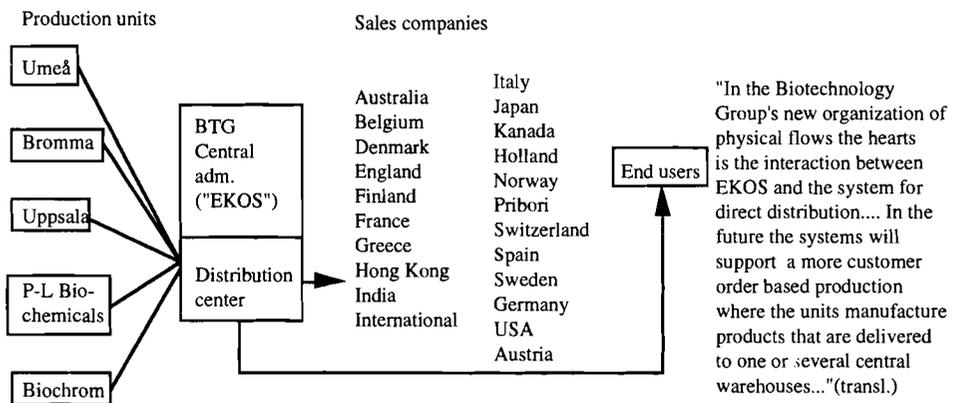


Figure 3.2. Towards a new integrated information system

The administrative project group ("the AU Group") which has the responsibility for the difficult task of implementing the new system parallel to all the ongoing organizational changes affecting Pharmacia LKB Biotechnology, introduces a step-wise implementation program. Special information system work groups are formed centrally and locally. As only the Bromma and Umeå organizations have resources for information system development, investments in new resources in Uppsala have to be made. Seven people are initially employed for the development work. Thereafter, local communication networks in Uppsala have to be established, and the DDS system has to be refined and implemented with central location in Uppsala. Following this, the new EKOS system is to be implemented in the central, Sweden based organizational units. A Materials Administration System for the chemical production has to be installed followed by the

¹³Bromma Aktuell, No 9, March 1988

development of the MAS system for the central marketing units. Thereafter, the work to finally integrate the global system of organizational units into a common information system can be started. During 1989, the implementation of the new information exchange routines and systems overlaps with the start of an intensified capital rationalization program in the distribution activities. The Capital Rationalization project, which is initiated by the new Pharmacia LKB Biotechnology manager, is given high priority and speeds up the process of creating administrative routines and information exchange to support a new efficient distribution system.

Overall, the new production organization, the R&D units, the projects and the new distribution oriented information system have to be adapted to a number of reductions in the new *product portfolio*. A comparison of the two companies' product portfolios indicates a strong product overlap in both standard and large scale chromatography.(Figure 3.3.)¹⁴

Product area	Market share		% overlap of LKB products	% of LKB total assortment	% overlap of total assort.
	BTG	LKB			
Liquid chromatography					
-instrument	20	30	75	35	26
-media	40	10	50	15	8
Large scale chromatography	30	1	100	5	5
Electrophoresis	8	30	0*	40	0
Molecular biology	10	10	0	5	0
				Total overlap:	39

* If the support products are included there was about 20% overlap

Figure 3.3. *Overlapping product portfolios* (Source: estimations by Wallberg and Wallberg, 1986)

The process of adapting and transforming the product portfolios begins in 1987, following a period of intense analyses of existing products, ongoing projects and long range product strategies. The immediate overlaps are basically handled in two different ways. The products that are overlapping are either to be replaced by new products or to be discontinued over a period of up to two years. To reduce the overlap of liquid chromatography instruments and chemicals, processes of discontinuing and repositioning products are started. An immediate effect of the integration is that the overlapping part of LKB's separation media program is stopped almost straight away. As this has been based to a large extent on supplies from a Japanese OEM, ToyoSoda, the integration process also has immediate effects on these external contacts. LKB's limited large scale chromatography program overlaps completely with BTG's products and successively all

¹⁴Wallberg, H. and Wallberg, C., *The Acquisition of LKB in 1986*, MBA Thesis, Uppsala: Uppsala University, April 1991, p.26

LKB products are being discontinued. In both electrophoresis and molecular biology, both companies' product lines remain unchanged.

The new product line that takes shape also contains a large number of old instruments and spare parts which together make up a large stock of articles. As ideas for a capital rationalization program are discussed in 1989, it is estimated that the new central distribution stores in Uppsala - after the move of the Bromma stocks - contain over 24,000 articles. A large number of these are classified as low frequency instrument parts.

In addition to the integration problems related to R&D, information systems and product portfolios, an important difference between Pharmacia BTG and LKB which causes a great deal of disturbance concerns the economic control systems. In retrospect, it is generally acknowledged that the problems of imposing Pharmacia's economic control system on LKB's global marketing system is an important reason for the escalating integration problems and brain-drain of sales people and management in LKB's subsidiaries. Pharmacia's centralized control system is acknowledged as the total opposite of the system applied by LKB. The LKB subsidiaries have functioned as profit centres and have much more freedom to act independently as regards pricing, and product and customer contact strategies as long as the economic results are met. Likewise, LKB subsidiaries' executive managers have also become used to a decentralized decision system. As the Pharmacia management and economic control system is applied on all LKB subsidiaries, as early as in the first quarter of 1987 a number of administrative adaptation problems arise in the process of integrating the marketing and sales operations of the two global marketing systems.

FOCUS: MERGING THE SERVICE SUPPORT OPERATIONS 1986-90

In broad terms, LKB's and Pharmacia BTG's customer exchange relations have been centered around the suppliers' provision of instruments, chemicals and reagents, accessories, application support services, including training, methods and written support, and technical support services, encompassing installations, the supply of spare parts, repairs and up-gradings of installed systems. In 1986, the different ways of handling customer relations in the two companies are to a large extent a reflection of the emphasis put on the different activities and products, including resource investments to support these activities. While LKB by tradition has built the activity and resource structures around its technical skills in instruments and technical after sales services, Pharmacia BTG has created an organization and resource structure emphasizing the actual application activities, including aspects of both the hardware and the application support

services. The fusion of the technical instrument service activities and resources becomes attended by problems, not only due to the different views that the companies have on the operations, as such, but on the way they are and should be integrated with the other customer related exchange activities.

The different philosophies regarding instrument services are to a large extent a natural consequence of the different historical backgrounds of the two companies. LKB emerges in the 80s as an industrial manufacturer used to competition in standard laboratory supplies and shrinking profit margins on instrument sales. The technical instrument support services grow out of this situation and are a reflection of the emphasis put on instrument sales, of the customers' demands for services, and is also a reflection of the awareness that profit margins can be increased by increasing the sales of spare parts, repairs and more. Pharmacia BTG, on the other hand, has been used to a constant, high level sales increase and stable, high profit margins. As a supplier of systems with a base in chemicals, the company is used to high profit margins on the chemicals, reagents and columns, and to some degree also on the advanced application support services.

In 1986, LKB has reached a more advanced level in the handling of after sales services in comparison to Pharmacia BTG, but both companies are in many respects still in the early stages of development. LKB's service organization begins to grow both locally and centrally in the 70s, but the acknowledgement of the activities comes during the first half of the 80s when the central, coordinative service support unit begins to grow and is coordinated with the other central management functions in Bromma. The relatively frequent contacts and short "distances" (in all respects) between the central units in the LKB organization increase the opportunities for the central instrument service function to influence product development, production and marketing. Pharmacia BTG's central service function is still relatively small at the time of the merger in 1986, and it does not have any significant influence on strategic marketing decisions. While LKB's central service function encompass around 20 people at the time of the merger, Pharmacia has only around 10 people employed in equivalent positions.

All product divisions responsible for sales and marketing of instruments in the two companies are in some way or another dependent on technical support services. In practice, this means that most of LKB's wide range of instruments manufactured in Turku (Wallac's instruments), in Cambridge (Biochrom's instruments) and Bromma (the electrophoresis, chromatography, and microtomy instruments) are in need of different types of services. The same applies to Pharmacia's standard laboratory, molecular biology and large-scale instruments. During the course of the merger Pharmacia's new

American diagnostics company, ENI, Pharmacia Deltec's infusion pumps and instruments, and the new Biosensor operations in Uppsala (the latter building on the new biosensor technology) come to require service support, or planning for future support. Thus, after sales resources are necessary both to support the Biotechnology Group, the Diagnostics Group, Biosensor, and also Deltec's products, the latter strongly related to the pharmaceutical organization's infusion product operations. In addition, LKB has a range of standard research instruments which needs support. The total, joint number of instruments at the end of 1986 is estimated to be around 180. The products are in different phases of the life-cycle. In general, most products are continuously becoming more complex, with electronic components and computer technology becoming a standard integrated part of most instruments and systems.

The problems of merging the two companies' instrument service operations are experienced on the central as well as on the subsidiary level. The major difficulties, however, prove to be the establishment of vertical integration, coordination and standardization of the activities, and the problem of establishing a functioning intra-organizational position for the new integrated, central service function. The latter difficulties remain important factors influencing the attempts to change the direction of the technical support activities in 1989-1990.

MERGING THE SUBSIDIARIES' AFTER SALES UNITS

The problems that the local service organizations meet during the fusion process mirror the general difficulties in merging the two nets of marketing subsidiary organizations. The outcome of the overall merger - the balance of LKB/Pharmacia resources, intra-organizational routines, customer exchange routines, customer relationships etc. - forms the prerequisites for the new local service operations. Due to differences in size, historical development, and power in relation to the home organization, both LKB's and Pharmacia's subsidiaries are already before the merger heterogeneous and the result of the merger is no immediate reduction in this heterogeneity. The new central service support organization that is formed in Uppsala already in the beginning of 1987 has to continue to interact with a truly heterogeneous global marketing organization.

The integration of the service support operations at subsidiary level follows the rapid pace of the integration of the sales and marketing operations in the subsidiaries. The loss of LKB service technicians is not as high as the loss of sales representatives. On the management level, however, the loss of LKB service managers equals the big loss of sales, marketing and subsidiary managers, causing a noticeable loss of competence and

knowledge of handling the contacts with LKB customers - in some cases causing irreparable breaks in the continuity of these contacts.

In 1989, two years after the merger, a questionnaire sent out from the central service division in Uppsala, investigating the routines for handling installation activities in the exchanges with customers, indicates that a high degree of heterogeneity has been institutionalized in the marketing organizations. In some subsidiaries, the service organization handles 100 percent of all installation activities and the subsequent follow-up service support contacts with customers. Sales and application representatives are engaged in the activities prior to and during installations. In other subsidiaries, the situation is the reverse, sales and application representatives take the responsibility for the customer contacts up to the point where the systems have been installed and are in use. In between the two extremes are a number of subsidiaries in which several units share the responsibilities for the installation activities. Some subsidiaries are able to internally coordinate the handling of customer contacts through different phases, in others the coordination urgently needs to be improved, according to the results of the investigation.

The heterogeneity among the subsidiaries in handling the different phases of the long-term contacts with the customers is strongly linked to the organizational resource structures that emerge from the integration process in 1987 and 1988. While Pharmacia before the merger has developed large application service units - handling customer needs related to the use of instruments and chemicals, etc. mainly during the sales and installation phase - LKB has made equally large investments in technical service support resources. On average, the central service manager in Uppsala estimates in 1986, the relationship between application technicians and service technicians to be 1/15 in the LKB subsidiaries and the reverse in the Pharmacia BTG subsidiaries. The ratio of service technicians varies between countries. In the extreme cases, as in Germany, LKB has built up a decentralized net of twenty three service technicians, while Pharmacia has only one full-time and one part-time technician; sales volumes and installed instrument bases are roughly the same. As LKB's service technicians by tradition have been placed nearer their customers and have been given the responsibility both for installations and continuous technical services, they generally have more intense and continuous customer contacts during the time when the merger starts.

A functioning division-of-work is started in the marketing subsidiaries being integrated. As the responsibilities for instrument service activities in many cases have been performed also by sales people and by application service representatives (especially within the Pharmacia organizations), it is necessary to work out, in each market

subsidiary, an intra-organizational structure and policy for how, when and by whom customer contacts shall be handled. These division-of-work adaptations are made locally, without much interference from the central units in Sweden, which are busy handling the integration of the central support functions. In the subsidiaries, the result of the organizational adaptations of each subsidiary's marketing, sales, application and technical service resources and activities for the biotech instrument business depend on the outcome of the coordination with other organizational units, with the Diagnostics Division, for example. The subsidiaries have to handle the fact that although sales and marketing for BTG and Diagnostics are handled separately in the organizations, some customers regard them as one and the same company, Pharmacia.

The big differences at the outset of the integration process in the beginning of 1987 is also explained by the different service strategies developed previously in the two companies. These strategies in turn have been based on the preceding market development experienced during the end of the 70s and early 80s. An important internal factor contributing to the institutionalization of the different strategies is the variety of economic control systems established in the two marketing subsidiary nets.

Before 1986, Pharmacia BTG has established technical service policies in the subsidiaries based on centralization. That is, service workshops and personnel are in most market organizations placed within the central premises of the subsidiary. In the case of instrument failure, customers' instruments are transported to a central workshop, and in some cases - due to the long-term sales expansion and high profits experienced - instruments are scrapped and exchanged for new ones. The LKB subsidiaries, on the other hand, have in general chosen the opposite policy. A high degree of decentralization of the service support resources guarantees that the distances to instrument users are short in most markets. Most technical support activities are performed within the customers' premises. In some cases, the choice is limited due to the size and weight of LKB's laboratory instruments.

During 1987, several of the new M.D.s of the subsidiaries (predominantly former Pharmacia managers) signal an increased tendency to want to centralize all service resources (mainly former LKB technicians and service resources) to centrally located work-shops, following established Pharmacia policies. The central service department in Uppsala - which to a large extent by now is predominantly former LKB personnel from the central service unit in Bromma - has to argue strongly against these tendencies in discussions with the new central marketing, sales and product units in Uppsala. The risks are considered too big that LKB customers will be lost in the process. It is argued that

many of these customers have chosen LKB just because the company has been able to offer after sales service near the customers. Eventually, the centralization trend stops.

The variations in handling the service activities are partly due to the differences in the economic control systems; while Pharmacia still controls the service activities through a cost center based system, LKB's service organization functions according to a profit center policy. Early in the integration process, it is decided by top management in Uppsala that all administration and economic performance control shall follow the old Pharmacia BTG routines. In practice, this means that the remaining LKB service personnel has to adapt to an "older" system, which in parts has been abandoned some years before.

One of the immediate effects of the integration in 1986 and 1987 is a growing confusion within the subsidiaries and the central service unit in Uppsala concerning the policies for warranty services. LKB and Pharmacia have different policies for when warranties are to be applied and how they shall be performed. Some activities are to be done without cost to the customer whereas others are not included in the warranty - and this can vary between warranties. The immediate result of the merger is that each new subsidiary becomes exposed to a variety of customer demands concerning warranties. This, in turn, increases the tendency among subsidiaries to transfer the costs for the warranty services performed to the central service division in Uppsala. The increased emphasis on capital rationalization and cost efficiency after 1987 causes the subsidiaries to minimize costs where possible. In the extreme cases, instruments which are over 15 years old are sent back to Uppsala. Transportation costs increase rapidly as this tendency accentuates. A set of standardized "return goods authorization" rules have to be worked out centrally, promulgated and implemented in the marketing organizations world-wide in 1987-88.

CREATING A NEW CENTRAL INSTRUMENT SERVICE DIVISION

As early as 1987, a new central Instrument Service function is established in Uppsala. The 2-3 years that follow are to a large extent devoted to positioning the new division within the organization and in establishing coordinated and standardized routines for economic control and administration of the service support activities. These processes take place in a situation where the new central unit is constantly shrinking. Just before the merger, LKB's service unit in Bromma consists of eighteen people. In Uppsala, eleven people handle the central service tasks. In the beginning of 1987, twenty six people remain within the new joint service division, and this number continues to shrink: from

twenty (1988) to eighteen (1989), to sixteen (1990). LKB's former Instrument Service Manager is appointed as service manager for this shrinking Service Division.

A crucial task for the new central unit during the first 2-3 years is to create for itself a functioning position in the new organizational context. The central HQ unit is given the overall responsibility for fulfilling end-users' long-term service demands and works through the local service departments in the subsidiaries. An important task in the early integration process is to ensure that, together with sales and marketing units, the loss of customer contacts is minimized (especially LKB customers). In addition to the routines and procedures that have to be worked out with the local service units, it is necessary to coordinate activities and policies with local subsidiary management and local subsidiary sales and marketing units. There are policies that need too be handled concerning installations, demo. instrument repair policies, pre-installation checks, the extent of free services to be supplied in order to generate sales, etc. In addition, support procedures with independent dealers have to be decided on in those areas where local sales offices and dealers are used.

Internally, the positioning process includes the relations to a number of units and divisions. The HQ service unit has to establish its role and work out contacts with Pharmacia executives at Biosystems level - the new integrated business unit for biotech, diagnostics and infusion products formed in 1989-90 - and in relation to BTG management. What status in the organization shall the service division have? Where in the new organizational structure shall the division be positioned? Within the newly formed so-called Biosystems Group 1989 there is the Diagnostics Division parallel to the biotech units, which is also engaged in after sales service activities. One of the crucial questions concerns how Diagnostics and BTG shall handle the fact that they are sharing service resources in certain subsidiaries. In 1989 - as BTG's service organization functions as a profit center while Diagnostic's service units still are operating as cost centers - a number of administrative problems have to be solved and contacts between the two central service units have to be established. Competition for existing service personnel increases between the two units as the two business areas are successively being disintegrated organizationally.

In Uppsala, contacts also have to be worked out with the new BTG R&D, Production and Marketing Divisions. In the former case, there arise concerns related to warranty services and costs due to quality problems in the production. Contacts with the R&D departments are needed in order to be able to plan for new product launches and new service demands due to changing products. In the meetings with the central

marketing/product divisions, the conflicting demands on the service and the sales divisions have to be handled. The sales divisions are governed by the signals that the pace in the sales efforts shall be kept during the merger process in order not to lose market shares. The signals to the service department to concentrate efforts on newly launched and installed systems stand in contrast to the efforts to handle and also keep old customers applying older systems. While the sales departments are working with a 1-4 year perspective in instrument sales - and want the service departments to be supportive in their focus on the first years of customer contacts - service departments normally make their main profits after this warranty period. A large number of LKB products are also discontinued in the merger process, while LKB customers' demands for after sales services remain. The contrasting philosophies need to be adapted by increasing the intensity of internal contacts and the frequency of joint meetings.

Internal coordination routines also have to be worked out with Biochrom in Cambridge. Services on Biochrom's products in 1986 are handled by the central service unit in England, but it is to report to the new HQ Service Division in Uppsala. Services on US based Pharmacia Deltec's infusion instruments installed among European customers also have to be performed in some local markets. During the integration period, the new Biosensor Group in Uppsala starts to build up, on a small scale, their own service support resources. The demands on coordination are minor here; the first generation of biosensor instruments are just being launched. Long-term policies for how service resources shall be allocated in the global marketing organization between the different Pharmacia Groups have to be worked out. There are a number of counterparts with which the new central BTG Instrument Service unit has to establish functioning routines. Parallel to this, the actual service support routines need attention. The mixture of former LKB, Pharmacia and new service policies and routines have to be adapted, stabilized and institutionalized in the marketing organization, and be coordinated with the rest of the organization.

The process of increasing the control over the global service activities and introducing more standardized exchange routines in the marketing system proves not to be easy. A number of measures are taken during the merger process:

-In 1987, the new central service unit works out a new, written checklist for the service activities which is sent out to the different organizational counterparts, locally and centrally. It is based mainly on former LKB service policies. It contains e.g. organization charts for the HQ service department, names of who is responsible for different support activities, lists of product names with names of responsible technicians, recommended service tools and spare parts to keep in stock, lists of information material that can be achieved, descriptions of special service support that can be obtained from HQ, check lists and rules for exchange modules and components, delivery levels and routines for spare parts, pricing strategies and policies, reporting systems including invoicing and quality reports, descriptions of service training courses, and address lists.

-In addition, forms for quality complaints and claims are distributed to the subsidiaries in order for HQ to increase the control over service quality aspects and forms for the registration of what service activities that are actually performed by sales, application and technical service personnel. The latter proves to be very difficult. Responses in the organization to the new report routines are marginal and few subsidiary organizations actually fill in the forms. The instrument service reports that are sent back to HQ only give some vague indications of the service activities actually performed in the local markets.

In the early integration phase there are also a number of crucial activities which have to be retained for the future, when organizational stability has been achieved: routines for the sales of service contracts, and the setting of goals concerning service levels. There is, however, little time to spend on planning for profit generating activities, as the tendency to send back warranties to HQ increases in 1987-88, taking most of the time and resources of the Instrument Service unit.

Former LKB routines in the contacts between the central service department in Bromma and the local service units has been based on fairly extensive personal contacts. There has been regular service conferences, HQ personnel have visited the subsidiaries and maintained personal contacts within the local subsidiary organizations. During the years following the merger these forms of personal contacts and visits successively decrease. There is an overall emphasis and concentration on "local" and "central" organizational integration issues. When direct contacts are taken with subsidiaries, HQ service personnel has to adapt to the fact that subsidiary organizations vary in size, power and internal organization. It becomes a matter of entering "at the right level" in the organization, in order to be able to influence and redirect service routines.

In 1989-1990, after a number of attempts to influence central BTG management, it is decided that Instrument Services shall become a profit center within the organization and a division parallel to other product divisions. At an international BTG meeting in Grisslehamn in Sweden in September 1990 the new BTG manager accepts the idea that - among a number of other projects - time and resources shall be allocated to a specific after sales service project. Among other measures, the market for service contracts shall be examined.

1990: A NEW INTEGRATED PHARMACIA-LKB BIOTECHNOLOGY ORGANIZATION TAKES SHAPE

A new M.D. for the new Pharmacia LKB Biotechnology Group is appointed, and is given the responsibility for the major re-organizations that are necessary. Much effort has been devoted to analyzing and deciding on a new production organization, in the light of increasing overcapacity. The difficulties with the production organization, and the

difficulties in deciding on a new, reduced and efficient production organization, is considered to be one of the major contributing factors behind the resignation of the President of BTG. When the new President takes over the responsibility, one of the first decisions concerns the production organization. Among the many options discussed - closing down Umeå and Bromma and building up a new production organization, closing down the Umeå operations and keeping Bromma, or closing Bromma and keeping the Umeå operations - the last option is chosen; the former LKB premises are vacated as of July 1991.

The intended and unintended consequences of the multitude of actions and reactions in the merger of LKB and BTG set the stage for the important strategic meeting in Grisslehamn in 1990. The meeting is arranged to be the start of a number of organizational change projects to handle the repercussions of the fusion and to meet the concurrent downturn of the whole biotech related industry. These change projects arise from a situation that has been shaped by many major changes in Pharmacia's biotech operations in the period 1986-90. The focus on merging marketing, production, administrative units, etc. separately, has resulted in processes whereby "isolated" or loosely linked central and local organizational units have emerged. In 1989-90, it is generally acknowledged that the process of reduced internal coordination and contacts between, above all, the central and the local subsidiary units must be arrested and reversed. The new biotech group is in the middle of a process where the internal, vertical contacts between central HQ units and the market subsidiaries and to some extent also the relationships between the latter and the customers gradually are being weakened. There is an accumulating need to re-arrange information exchanges, to standardize the heterogeneous subsidiary organizations and to standardize internal control systems.

The mixture of internal organizational and resource structures in the subsidiaries is the cause of internal tensions; the process of separating the biotech, the diagnostics and the pharmaceutical operations and resources in Pharmacia is still going on and is more apparent locally than centrally. In the process of creating the Biosystems group in 1989-90, encompassing diagnostics, biotech and infusion product operations, new internal tensions emerge. The biotech supply organization is leaving the long-term process of merging with LKB, entering the Volvo-Procordia venture with significant effects on the whole organization of the Pharmacia Group.

As a result of the LKB merger, the stocks of chemical products, instruments, spare parts and accessories is growing towards the end of 1989. Both in the local subsidiaries and in the central warehouses in Uppsala and elsewhere, the stocks of slow moving products are

growing rapidly. A mixture of distribution routines and policies is penetrating the intra-corporate organization. As regards the services, the heterogeneity of local policies for application and technical services is increasing and the level of central coordination and standardization of the technical services especially is rapidly decreasing.

The subsidiary organizations during the preceding period have implanted a mosaic of internal routines and organizational arrangements. It is acknowledged in 1989-90 that something has to be done about this global net of subsidiaries. The lack of stable coordinative routines between HQ and the subsidiaries and the local heterogeneity is the cause of growing internal concern.

The Volvo-Procordia deal is announced and the biotech operations are formally integrated in a larger group of related companies - Pharmacia Biosystems.

The new conglomerate of biotech organizations that will become part of the emerging Biosystems group in 1990 is in many ways different from Pharmacia's Biotechnology organization that enter the peak of external expansion in 1986. The former Separation Product Division is now entering a new period of change, but coupled to new types of organizational problems that have to be solved. The Biotechnology organization is in 1990 in a paradoxical situation. Despite the growth of the biotech organization and the increasing interdependence as separate business operation, the traditional, stable organizational interdependence with the diagnostics and part of the pharmaceutical operations seems to be increasing as the Biosystems group is constructed. There is certainly no shortage of work to stabilize the changes in the biotech operations accelerating 1986-89; simultaneously there are strong indications that behind the signs of stabilization after the merger, Pharmacia LKB Biotechnology is entering a period of new types of changes, many of them aimed for the heart of the company's marketing and distribution activities.

NOTES: SUMMARY OF LKB's MAJOR ALLIANCES, ACQUISITIONS AND ORGANIZATIONAL CHANGES 1973-1986

1973

A new internal organization plan is presented. The main changes concern the internal organizational headquarter level. Efficiency aspects govern the change and adaptation to the new internationalized production operations.

1974

Production resources at the BioCal plant in Munich which are acquired in the merger in 1972 are partly transferred to Bromma in the first step of concentrating and coordinating production resources.

1974

In August 1974, a new organization for LKB is presented. The business activities are divided in four clearly defined profit centers with cost and profit responsibilities. Each of the four new divisions controls its own marketing and development resources or purchases them from the central, re-organized and reduced sales, technique, production, development and administration units. Beside the two established divisions for Clinical Analysis and Biochemical Research two new divisions with profit responsibility are created; the Spare Parts and Consumables Division and the Venture Division. The latter is created with the purpose to expand into new customer and product areas, e.g.. industrial customer groups. For the Spare Parts and Consumables Division with responsibility for ordering, distribution, storing and technical support it is stated that an increased customer service orientation is to guide the work.

1974

A production coordination unit is created in order to improve coordination of the different production units.

1975

LKB acquires AGA's subsidiary AutoChem Instrument. The company develops automatic analysis instruments for clinical laboratories, e.g. for blood analyses. AutoChem is managed as a separate unit within LKB's Clinical Division. AutoChem's production is successively transferred from AGA's operations to Bromma. AutoChem continues to cooperate in R&D with AGA's subsidiary AGA Innovation.

1977

Due to increased competition and levelling sales growth, LKB intensifies its search for alliance partners. The Japanese competitor Shimadzu is among the companies that are approached. Customers' demands for integrated systems of instruments, chemicals and application support are important driving forces behind this search.

1977

A major change in LKB's development takes place at the end of the year as LKB agrees to transfer all its resources in the clinical instrument area to a new subsidiary of the German firm Boehringer Mannheim GmbH. The latter takes over 80 percent of the shares in the new company while LKB keeps 20 percent. (Shortly after it is changed to 90/10). The companies have been cooperating since 1969 and the agreement means that LKB sells off product lines contributing one third to LKB's total sales. Nearly 370 of totally 1500 employed are affected. The deal is a step in LKB's concentration efforts. In the company remains basically the traditional business; instruments and equipment for the academic world, for research organizations and for industry. The deal with Boehringer also includes R&D agreements and agreements to combine LKB's instrument business with Boehringer's activities in fine chemicals. In total, three of LKB's product divisions are transferred to the new venture. The merger process also includes coordination with Boehringer's American company Bio Dynamics, active in the same area and acquired by Boehringer before the LKB deal.

In January, a new LKB organization is presented, adapted to the reduced number of divisions. Four functions are created: Research Instruments, Materials (responsible for materials management and distribution), Administration and Component Production. The last function becomes a sub-supplier of components to a number of Incentive related companies mainly: Jungner, Auto-Tank, Boehringer Mannheim, other LKB divisions, etc. The big re-organization is partly a result of the need to improve internal coordination and reduce capital costs in the total distribution chain. Efforts to improve distribution services to customers are emphasized. The remaining LKB-Bromma product division,

Research Instruments, is divided into five product lines: Biochemical Products, Fine Chemicals, Laboratory Instruments, Ultramicrotomy and Fermentation&Calimetry.

1978

Investments in the development of new fine chemicals are made in order to become more "system oriented" in the supply of total solutions to customers. Other important steps in this process are the take-over of Aminkemi's (an Incentive owned company) production of fine chemicals and a cooperation agreement with the Danish firm Dakopatts.

1978

In order to improve efficiency in the marketing activities of the sales subsidiaries a regionalization process is initiated. The goal is to coordinate three or four subsidiaries' activities, with one of the three subsidiary managers responsible for the region. The aim is to create a Northwest Region, including Denmark, Holland and Belgium, with the Danish managing director as head of the region. Moreover, strong efforts are put into improving the central marketing support and routines in relation to subsidiaries, sales support offices and agents. LKB takes over the sales of Wallac's instrument in Sweden from the Junger owned company Biotec.

1978

LKB acquires the product lines of microtomy instruments from the Swedish firm Palmstiernas Mekaniska Verkstad. LKB has been marketing PMV's instruments in certain markets since 1975. LKB also acquires Buchler Instrument Inc. in the USA from the pharmaceutical corporation Searle. Buchler develops, manufactures and markets instruments for research laboratories, e.g.. electrophoretic instruments and fraction collectors. LKB thereby becomes linked to Buchler's marketing network consisting of contacts with 12 independent wholesale firms with a total of 3000 sales representatives.

1978

In an internal reorganization, LKB-Bromma is implemented. The new unit is created in order to establish similar functions and internal positions for all producing units in the corporation, i.e. LKB-Bromma, Biochrom, Wallac and Buchler. The internal re-organization process appears concurrently with an intense introduction of new products. In total, seventeen new products are launched during the year.

1978

A decision is taken to invest in an integrated computer based system for purchasing, ordering, warehousing, sales administration, pricing routines, etc. The investment is large and a first step in a radical change of the intra-corporate coordination routines, involving all internal units. The implementation of the new system, "ALBERT", starts in 1979 and continues during the first years of the 1980s.

1979

LKB re-organizes its sales in the Swedish home market. Since 1968 LKB had been marketing the products through a jointly owned company, LKB-Beckman Instruments AB, together with the American manufacturer Beckman Instruments. At the start there was no competition between the companies, but as the two companies extend their product programmes - LKB through the acquisitions of Wallac and Biochrom - competition increases, e.g.. in amino acid analysis. This forces LKB to look for other distribution channels in Sweden for these products, e.g.. Jungner-owned Biotech organization. The result is confusion among customers and in 1979 LKB therefore offers Beckman to take over LKB-Beckman AB, and LKB starts its own sales company in the home market.

1979

In March 1979, the new LKB organization is officially presented. The Bromma production unit reports as other production companies to a corporate management unit in Bromma. Simultaneously, a central unit is created for handling sales to the growing Chinese market.

1979

A new competitor in the area of fraction collectors appears - Pharmacia AB in Uppsala.

1980

LKB arranges the first corporate-wide conference on services led by the central service unit in Bromma. All foreign subsidiaries and the production companies in Finland and England participate. The conference signals the necessity to focus on technical support and customer services.

1980

LKB-Bromma's organization grows as a new function, (International) Corporate Development & Coordination is established. Its task is to improve coordination between marketing units worldwide and the foreign production units with LKB-Bromma's operations. Minor adjustments in the new organization concept presented in 1979 are performed.

1980

LKB sells its shares in LKB Clinicon AB controlled by Boehringer Mannheim GmbH.

1981

LKB-Bromma re-structures the central management functions. Four specialized management groups are formed to support coordination of 1) marketing and sales, 2) production, 3) financial matters, and 4) development issues. The four groups work with representatives from units in the whole LKB corporation.

1981

A capital rationalization program is implemented in order to reduce capital costs in distribution, materials management and purchasing. In addition, programs to speed up production and reduce the rate of delays and lags in production operations are started. Cost efficiency programs become central corporate wide issues. Still, the number of new products launched during the year is large. Among the new products is a new HPLC system in the separation product area.

1982

The new HPLC system is launched world wide. A minor problem is the fact that the new system competes with Biochrom's main product line in the area of protein analysis. It is one in a number of successive steps which change LKB's competitive position. Instead of being compared with the supplier of clinical instruments, Gambro, it becomes clear that Pharmacia is now LKB's main Swedish competitor in separation instruments.

1982

LKB sells the American production company Buchler Instruments Inc. to Incentive's American subsidiary Incentive Inc., which together with the English company Fison's American subsidiary Haake Inc. form Haake-Buchler Inc.

1982

LKB establishes its thirteenth sales subsidiary by forming a joint sales company in Switzerland with its former agent, Werner Meyer. Concurrently, the company owned sales subsidiaries increase its share of total LKB sales to 80%. The rest is covered by independent agents.

1982

Incoming orders for the three most sold product lines increase by 53% on average, compared to the year before: electrophoresis 75%, chromatography 65% and ultramicrotomy 37%. Sales increase by 25% and the result by 112%. An expansion of the production resources e.g. in Wallac's premises in Finland is necessary.

1982

The efforts to establish an integrated computer based system for LKB-Bromma, linking production planning, materials administration, purchasing and order registration begin to function more smoothly. Results are improved as a consequence of this.

1982

In order to improve coordination with the marketing units world wide and adapt to the expansion in new product areas, the central organization is restructured. Two divisions are formed, each divided into different product lines: the Division for Biochemistry (Bioanalytical Chromatography, Biochemical Chromatography, Large-scale Chromatography, Electrophoresis, Industrial Applications, and Chemical Production and Sales Support/Chemicals) and the Division for Microtomy (Microtomy and Ultramicrotomy). For all product lines three central support divisions are formed: International Sales, Distribution and Service. The latter are formed by grouping together central service resources which formerly belonged to each product line.

1982

LKB decides to increase its operations in chemicals and reagents. A minor cooperation agreement with the French manufacturer of chemicals, IBF, established at the end of the 70s is expanded. Wallac in Finland decides to invest in new production facilities for reagents. Chemicals and reagents in four areas are focused

on: electrophoresis, chromatography, high performance chromatography and ultrastainer chemicals for microtomy. In addition, industrial customers and applications are becoming more important.

1982

LKB reorganizes the central research and development departments. In order to become more market oriented and adapt to the user situation, LKB abandons the former division into technique areas (chromatography, electrophoresis etc.). Instead, the R&D department is divided in three sections covering the three main "products" purchased by customers: Instruments, Chemicals and Methods/Applications.

1983

LKB is listed on the Stockholm Stock Exchange and Incentive AB provides LKB SEK 75 M by means of a new share issue.

1983

The organizational changes that were implemented during 1982 begin to have their full impact during 1983. These include the investments in new production facilities for reagents, e.g.. at Wallac. The many years of efforts, projects and intra-organizational changes to improve productivity and the use of capital begin to have apparent effects. During 1983 a new central service function is established - International Service - to coordinate service activities globally.

1983

The emerging changes in the product lines, e.g.. the fast growth of the HPLC products and the introduction of Wallac's immuno-analysis instrument TR-FIA after ten years of R&D are some of the driving forces behind the successive organizational adaptations in the global marketing organization. The growth of the sales organizations and the change in product lines speed up the efforts to divisionalize and specialize sales. As a result of the rapid expansion of the LKB range, it is possible for the majority of sales companies and agents to concentrate their efforts on LKB products. Accordingly, a decision is taken in 1983 that most of the agencies held by e.g.. LKB Sverige AB will be assigned to a separate company. Similarly, the agencies for Engström Medical products in the U.S. and the U.K. are terminated during the year, permitting the sales companies to concentrate their efforts more on LKB products. A major agency in Denmark is also terminated.

1983

The principle of cooperating closely with agents e.g.. through sales support offices is applied to a still greater extent. Sales support offices in distant regions, eg.in Asia are reorganized.

1984

LKB takes a step into the area of molecular biology by signing a research cooperation agreement with Columbia University in New York for three years. LKB develops instruments and chemicals in the area based on Columbia's research results.

1984

LKB continues to develop and expand its Bromma unit for chemical production. A separate R&D unit for chromatography and electrophoresis chemicals is established.

1984

LKB establishes a sales subsidiary in Japan, LKB Nippon KK.

1984

The increasing importance of application support and methods to customers results in a re-organization where a separate Application section is created at Bromma.

1984

A number of internal, divisional projects are started in order to continue the internal efficiency programme. Apart from reduction of stocks and reduced production lead times, it is acknowledged that product standardization and reduction of the constantly growing product range is necessary. However, the new internal organization plan that is presented in April, stresses the need for improved communication with sales companies and agents. Distribution and service support issues are focused.

1984

A new separate company for the clinical market is established in the US company LKB Diagnostics Inc. Wallac's products form the base for the new company's sales.

1984

The launching of Wallac's DELFIA system, including instruments, methods and diagnostic reagents, means that LKB establishes a strong position in the diagnostics business.

1985

The success of the new DELFIA system is behind LKB's largest production investment ever. An extension of the production premises and capacities in Turku of nearly MSEK 60 is a direct result of the success with DELFIA. New production facilities are also opened at Bromma.

1985

The LKB management presents a new and substantially revised organization. Compared to other, successive intra-organizational changes during the last five years this is a major change affecting both the central units and the market organization. One of the underlying driving forces is the fact that both sales and the number of products sold has doubled during the preceding 3-4 years. The key words for the organizational change are market orientation.

At corporate management level, three committees are created in order to support management with continuous information on questions concerning R&D, marketing and production. They consist of representatives from all divisions. Five permanent support functions at top level are formed to handle important questions for the new and larger LKB organization, e.g., external relations and information, human resource development and corporate information system coordination.

LKB's business operations are adapted to the fact that two distinct customer groups can be distinguished; research institutions and industrial customers, and clinical customers in health care. Therefore two Business Groups are formed: Research and Industrial, and Clinical. They are each divided into two business units: Separation- and Biotechnology and Biochrom(R&I), and Wallac and Diagnostics(Cl.) The new business unit Diagnostics encompasses the microtomy and microbiology activities, and the formation of the division signals a (re-)entry by LKB-Bromma into the clinical area. Each business unit is divided into a number of technology based Divisions. The aim is to increase each Division's control over its development resources and activities while decreasing the distance to the market.

As regards the production units, it is decided that in principle the units shall be free to supply products to all divisions in the corporation. Belonging to the production units are the departments for Distribution, Customer Service and Chemicals. In addition, the R&D departments are divided up and grouped under each Division.

In the sales organization, the regionalization ideas are taken one step further as sales companies, sales support offices, and indirectly also distributors are grouped into five Regions, each with a responsible Regional Director. (The latter is chosen from the Managing Directors in the subsidiaries in each region). The newly formed Japanese subsidiary is built up during the year and is initially excluded from the regionalization. The transition from sales through distributors to building up a wholly owned organization is coupled with problems. In all large and medium sized subsidiaries, the divisionalization and specialization of sales resources continues. Some companies continue the expansion by moving into new, larger premises, e.g., in France.

The overall plans for the reorganization are presented in June. During the autumn the planning continues more intensely in separate working groups. The new organisation is set from the 1st of October, and in the accounting routines from the 1st of January 1986.

1986

In January, LKB sells its shares in the Swedish company LKB-Sartorius AB to Sartorius GmbH. The company was formed in 1984 in order to operate the remaining agency business in Sweden as LKB formed an LKB exclusive sales organization.

1986

In August LKB signs a licence agreement with the American company Gelman Sciences concerning the development and marketing of Gelman's electrophoretic gels. The products complement LKB's instruments in the electrophoresis area.

1986

LKB strengthens its position in clinical diagnostics and molecular biology by acquiring 38% of the shares in the French company Sebia SA, manufacturing instruments for clinical electrophoresis. LKB

complements its product program and strengthens its position in clinical electrophoresis while Sebia gets access to LKB's global marketing network.

1986

LKB signs an agreement with the American company IBI on cooperation in the area of molecular biology. IBI manufactures and markets instruments and systems for molecular biology research. Like in the case with Sebia, IBI gets access to LKB's global marketing network, while LKB can complement its product program in the new molecular biology area.

1986

LKB signs an agreement with Hitachi America, Ltd. to market world-wide Hitachi's advanced computer program for molecular biology applications.

1986

In September the first meeting is held by a regional group since the announcement of the regionalization of the sales organization. The managers of the subsidiaries in Region II (Germany, UK, France, Italy, Belgium, Holland, Switzerland) meet in Bromma to coordinate sales volumes, resources, organization development processes and market strategies).

1986

In October, after several months of negotiations, it is officially announced that Pharmacia AB aims to acquire the shares in LKB Produkter AB.

4 New Changes and a New Emerging Continuity 1993-1995

Pharmacia Biotech's efforts begin to bear fruit in 1993, paving the way for a more stable situation. Both sales and operating income increase rapidly during the year. However, the situation is now far from that experienced during the years of stable, rapid growth in the late 70s and early 80s. Pharmacia Biotech's position as one of the leading suppliers in the global biotechnology supply business is no longer self evident; a dramatic increase in competition and more openly customer driven operations indicate that the new emerging stability and differential advantages of the company are going to be founded on a variety of factors, and not be dominated by successful internal product development.

The income and sales figures for the period 1990-1993 indicate that the steady decrease in sales and profitability during the years preceding the period, now has changed into a situation of steady increase:¹

	1990	1991	1992	1993
Sales(MSEK):	1803	1857	1917	2702
Op. income(MSEK):	- 70	96	111	333

In the global biotech supply industry, it also means that the unit Pharmacia BioProcess Technology remains the world leading supplier of industrial purification, bulk chemicals and associated supplies and services, that Pharmacia LKB Biotechnology is one of the five leading suppliers of laboratory supplies in its area, and that P-L Biochemicals is one of the tenth largest suppliers of biochemicals in the world.

Perhaps more importantly, some of the internal operations and routines are generally becoming more stable in 1993. Since the start of the merger with LKB in late 1986,

¹Annual Review 1993, p.5

continuous organizational changes have allowed only a minimum of new and standardized operational routines to become institutionalized. The situation in 1993 is different.

The idea of direct distribution to customers (in the European market with 40 percent of total sales) has become established in the organization. During the period 1993-1994, it is a matter of speeding up the process of implementation and covering the last regions in which the customers still receive goods through some kind of intermediary units.

The key account management and associated telemarketing activities are not implemented but a growing number of the local sales offices are in the process of adopting the underlying ideas and taking the first steps towards implementation. During 1994, the idea about the importance of moving towards new ways of handling customer contacts, including new views on the technical after sales service activities, is becoming firmly established in Pharmacia Biotech's central, regional and local organizations. During the autumn 1994, the new global market and marketing reorientation program is formalized, given the name BioDirect. This is supported by a new standardized EDI system with improved on-line contacts between organizational units, standardized cost control and report systems, considerably reduced administrative resources, institutionalized quality improvement programs, and a reorganized R&D organization. Pharmacia Biotech in 1993 is beginning to leave behind the old Pharmacia traditions connected to the internal view of the Pharmacia group as a "business university", stabilizing routines connected to a more "industrialized" way of managing the company's operations, with continued concern for improvements in both efficiency and effectiveness.

Pharmacia Biotech can now concentrate on its own business, connected to what seems to be a definite step in the general long-term - but at times reversed - process of organizationally uncoupling the biotech operations from the other business units and operations of the Pharmacia (later Procordia) Group. There are strong signs that Pharmacia Biotech is establishing its organizational and operational independence - while still remaining a self-contained business area within the Pharmacia Group - in relation to the pharmaceutical organization in which it was born. The remaining links as supplier of products and supplies - mainly process scale products and services to Pharmacia's pharmaceutical production - are definitely established as one regular supplier-buyer relationship among many.

Technologically, the dissolution of Biosystems means that the organizational and technological links to areas outside laboratory and large scale purification and molecular

biology research and production are uncoupled and Pharmacia Biotech's orientation towards these two broad areas is set. The general change towards molecular biology research, application and production among customers is established as the major driving force for Pharmacia Biotech's technological and organizational development.

In this situation of growing stability in many areas, many already ongoing processes of change continue, new organizational changes are begun and some future changes can be anticipated in the period 1993-1994. A new radical intra-organizational change is implemented towards the end of 1993. The European regionalization program is taken a step further, and the process is also partly taking a new path. The vertical coordination and intra-organizational contacts continue to change. New technological orientations wait around the corner. Lastly, changes in the industry raise the interest among biotech equipment suppliers, including Pharmacia Biotech, in strategic alliances and cooperations with other companies. The general process of increasing size through acquisitions and mergers continue - resulting in the large biotech suppliers getting larger - but is coupled with a new interest in alliances.

FROM THREE PRODUCT COMPANIES TO FOUR INTEGRATED PRODUCT DIVISIONS - INTERNAL ADAPTATION TO CUSTOMER DEMANDS

After the dissolution of Pharmacia Biosystems, the remaining biotech supply organizations enter a new phase in the long-term process of organizational change and adaptation. The internal organizational changes beginning in the late 70s and continuing throughout the first half of the 80s have been strongly connected to the idea of close internal technological connections and synergies between Pharmacia's pharmaceutical, diagnostics and biotech operations. The idea remains, but it is successively being dissolved during the coming period 1986-1991. Organizational changes and adaptations are based on new logics of what shall constitute "the wholes" to which the biotech supply operations belong. Adaptations are also based on a more open separation of "pharmaceutical" and "non-pharmaceutical" technologies and organizations.

From 1992, with the creation of Pharmacia Biotech, there is a new shift in focus; organizational change efforts are coupled to the contacts between the three remaining product companies and their respective contacts with the customers. The attention shift means that new organizational adaptations more openly become driven by pressures to adapt the contacts to match the way in which the customers are organized. It begins locally, driven for example by the regionalization program in Europe. In 1993, it is taken

a step further, as Pharmacia Biotech decides to tear up the old, internal division into three product companies for laboratory, process and molecular biology products.

When the first up-scaled separation products are developed in the early 60s, it means that the first steps towards an organizational division into a laboratory and process group is taken. The third unit in the emerging triad, the molecular biology division, comes later and is definitely set in the acquisition of US based P-L Biochemicals in 1982. However, a decade later the triadic division into Pharmacia LKB Biotechnology (laboratory products), Pharmacia BioProcess Technology (process scale products) and Pharmacia P-L Biochemicals (molecular biology products) is being questioned. The key features and driving forces for organizational marketing changes are changing. Organizational adaptations are increasingly becoming responses to gathering external pressures, from the customers.

A number of general customer and market changes are acknowledged in the official Pharmacia Biotech reports of 1993. The recession and pressures facing pharmaceutical and biopharmaceutical customers in the company's major markets (USA, Japan, Germany, UK and France) hit biotech suppliers in general. However, there are differences between the regions:²

In Europe, spending on capital equipment in universities, which had been kept at a particularly low level during the first half of 1993, showed an upturn during the second half of the year. In the USA, investment in academic research has been further reduced, demonstrated in fewer grantees (albeit with longer grants). The changing emphasis in the USA is for increased industrial funding of academic research groups. Government funding is focused on large, multidisciplinary research projects. As a consequence, demand for research products has decreased considerably. Market growth in the United States has been further affected by several other factors: industrial customers are consolidating; many product areas are becoming more mature and therefore saturated; as funding is reduced the ability to replace equipment has been slowed; new researchers are having difficulty in obtaining funding and there is a distinct trend towards multi-user-use of equipment as funding becomes scarcer. Sales in Japan to the research market have, in contrast, been positively affected by special government funds.

And in this situation, there is a general shift in focus in the whole biotech supply industry:³

Throughout the industry there is an increased emphasis on added-value, quality and customer satisfaction...

The changes concerning the academic customers are complemented with equally important changes among the industrial users in the pharmaceutical industry. Or rather, in the analyses of industrial customers, Pharmacia Biotech acknowledges a process which

²*Annual Review 1993*, p.9

³*Ibid*

has been going on for quite some time: pharmaceutical companies turning to molecular biology and the new biotechnology as the new technological basis for pharmaceutical R&D and production use supplies for *all* stages in the process; initial, basic research, applied research, pilot plant studies and production, and full-scale production. Although these customers successively have been integrating the various steps leading to large scale production of biotechnology based pharmaceuticals, Pharmacia Biotech's divisions have by tradition treated the various steps as separate business opportunities. The central product companies of Pharmacia Biotech have been working parallel with several organizational units and contacts within the pharmaceutical companies.

The process of centralizing the number of contacts, giving key account responsibility to certain sales units in the local sales companies is one step in the process to coordinate the parallel contacts. However, there remain uncertainties concerning the organization of the back-up units and functions in the regions (i.e. Brussels) and in the central organizations in Uppsala and USA (i.e. P-L Biochemicals). Should they remain uncoupled or should they also be connected horizontally and vertically in a way which equals the customers' internal situation, the new local sales units' key account organizations and the new emerging contacts between customers and sales units? As described by the new regional director of the Brussels organization:⁴

What has happened during the 1980s as concerns our marketing functions is that the importance of the pharmaceutical, industrial process customers has increased. To be successful among them we need to be present, in the customer organizations, already in the development phase. And it is becoming increasingly important to connect the laboratory and process scale activities out there, locally, in our contacts with the customer organizations. But it can be perceived as a remaining organizational weakness in the Uppsala organization, which still has not connected the laboratory and process functions....

In mid 1993, a formal decision is taken to radically reorganize the internal organization of Pharmacia Biotech. At the end of 1993, a new formal organization is presented:⁵

In line with the strategy of further consolidating the company's strong position in the market and focusing even more keenly on the needs of the customers, Pharmacia Biotech was restructured at the end of 1993. The former product companies were phased out to make way for four product divisions - Consumables, Process, Reagents and Systems - under one management and sharing common resources for R&D and Operations Support.

Thus, it is time to attempt another, and compared to the 1989 Biosystems venture quite different, radical break with established organizational traditions. However, this time the change is linked to an already ongoing, locally started, process, the attempt to adapt to emerging changes in the key accounts' organizations. Discussions on the new organization encompass suggestions to modify the new, local sales and key account

⁴Interview, Regional Manager, Brussels, November 1993

⁵*Annual Review 1993*, p.11

organization, the regional support organizations and the central product company organizations in Uppsala. It is time to adapt and make radical organizational and operational improvements in the whole vertical channel, from the customers to the central production companies.

In the internal discussions there emerges a broad picture of the desired future state for the whole organization in relation to its changing environment, i.e. the customer contacts. The organization is already in a state of transition. In the fall of 1993, commitment in the whole Pharmacia Biotech organization is built around particular change objectives to move certain parts of the organizations - locally and in the regions - through these transition states. In other parts, in the Uppsala headquarters, for example, it is a matter of starting a more radical, formal and operational reorganization. Despite the clearer view of the preferred future marketing organization, some ambiguities and uncertainties remain. The "new" organizational channel structure that Pharmacia Biotech is moving towards takes the changing user situation as starting point.

In the central product companies, the first steps of change give as the result four partly new, partly unchanged Divisions for:

1. Process; responsible for the production and support of the large, process scale chromatography systems
2. Systems; which is to contain three units, for Purification on a laboratory scale, Molecular Biology Systems (also on a laboratory scale), and Instrument Service
3. Consumables; responsible for the standardized supplies and media with a large turnover, sold through the new telemarketing units locally and also by sales representatives
4. Reagents; which is basically the established P-L Biochemical company in USA, responsible for the production and support of the molecular biology reagents and fine chemicals

The change in the production company structure is not to stop with only a change in the names of the three existing company units. The emerging user links between large scale and laboratory scale purification activities motivate a new marketing and sales support organization in Uppsala, which is able to connect the support of the two new divisions Process and Systems.

The new regional organization, (initially, mainly focused on Region Europe), needs to adapt its present young organization to be able to both link to the new central Division organization and to the preferred state aimed for in the local sales organizations. The present organization with an overall sales function with a vice president of sales, and a regional marketing organization with separate marketing managers for Media (both laboratory and process media), Supplies and Reagents (including electrophoresis

reagents, P-L's reagents and standard supplies, and Research Systems (e.g. molecular biology systems) needs to be changed and adapted to its role as intermediary support organization. Three regional units are to make up the new regional organization, according to the new plans: one unit - Process - for large-scale chromatography systems (instruments and media), one for Systems which is equivalent to the Uppsala unit, and one for Equipment and Reagents, to support the sales of more standardized instruments and P-L media. However, no particular sales support unit for Consumables is to be formed in the regions. As with certain products belonging to the Equipment and Reagents unit, most of the marketing activities can be supported by a small, direct marketing group, giving support to the basically localized direct marketing and telemarketing activities for these products.

The new preferred organizational structure for the next level in the marketing channel, the local sales companies, is not altogether clear in 1993 due to uncertainties about the technical support structure involving the local sales and marketing people, i.e. the salesman and the key account managers. In general, the new emerging key account organizations are based on the idea that those with key account responsibilities shall be able to support the customer in all product areas, independent of technology. When it is working it is an efficient way to standardize and make more efficient the contacts with important customers. The new ambiguity concerns whether to accept a division of the local key account responsibilities. The key account managers need to handle the whole assortment of products, and the dividing line is not particularly difficult to recognise: it is a matter of keeping updated on both purification systems and the dynamic area of molecular biology systems. The question is whether to take a step in the direction of local specialization of salesmen and key account managers into these two main areas. As regards the sales support people, the local specialization is already an unavoidable fact in most of the European companies. When it comes to the appointed key account managers, the situation is initially somewhat more diffuse.

An important part of the implemented change is the concurrent change of administrative cost control system. A new standardized cost control system is to be implemented which is made, as far as possible, independent of future vertical organizational structure. Cost shall be measured regularly, and the consolidated responsibility for the cost is to be with the central Divisions in Uppsala and USA.

When the central management group in late 1993 can look back at the ideas and tentative plans and discussions of the management group meeting of November 1991, some of the ideas now carried through match the plans presented two years earlier. However, the

customer driven organization process is more marked, now taking the transition a step further. (Figure 4.1)

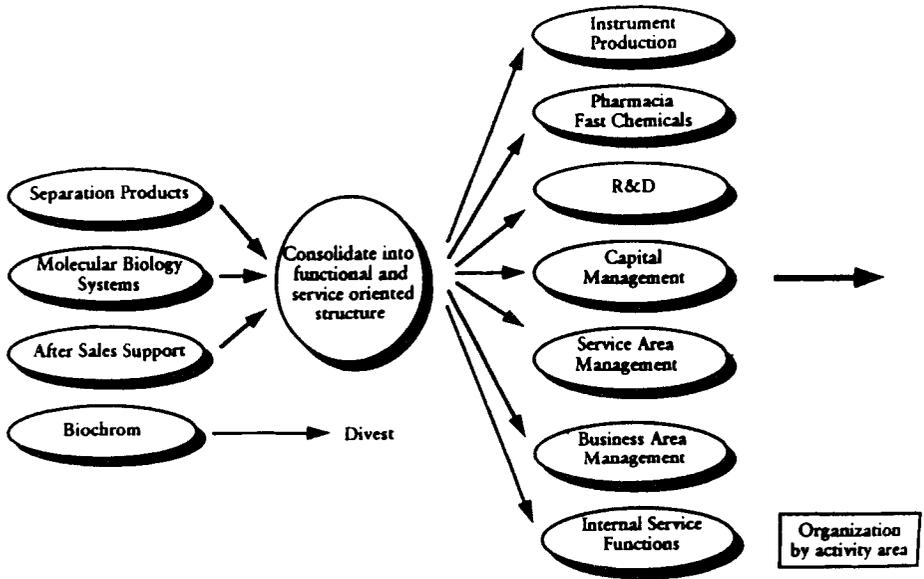


Figure 4.1. The planned Transition Organization 1991

The overall change from a formal organization with three Product Companies into four new Divisions/Business Units is set, however, with a somewhat different structure and labelling of the four new customer driven Divisions. The same can be said about the transitional structure, which in parts has been only what it was meant to be, a formal, transitional structure with little resemblance of the future preferred state of the operational structure.

The former LKB subsidiary Biochrom in Cambridge remains and is reorganized during 1993, while the former LKB sister company Wallac of Procordia Invest is sold to US company EG&G in June 1993.

The organization as of late 1993, including the attempts to find a new vertical marketing organization which is better suited to the interface with the customers, is strongly linked to the progress made in the continuing regionalization program. The efforts to find a suitable organizational structure for the intermediate, regional unit in Europe - adapted both to the central units in Uppsala and USA and to the local sales offices - connect to the next step in the process. The overall responsibility for Region Europe is to be transferred to the German organization in Freiburg....

NEW DIRECTIONS IN THE REGIONALIZATION PROGRAM

The regional European organization structure is also in an open state of transition in 1993. The process to implement a pan-European marketing organization with local sales offices under the control of a regional headquarters organization is centered around two interconnected problems: to find a functioning and efficient administration and to handle the legal aspects of going from nation based, independent subsidiary organizations to one regional organization with local sales offices, loosely connected in different sub-regional constellations.

It proves difficult to handle the legal and administrative aspects of the regionalization with a regional office in Brussels. The problem of finding a functioning future legal structure will, according to internal analyses, be best solved by letting one of largest, long established, centrally located, and internally powerful subsidiary organizations acquire the other local organizations. The choice of regional organization should also support the already ongoing reduction of the still overdimensioned administration at all levels.

The range of possible choices is limited. During the fall of 1993, the idea to transfer the whole or parts of the regional organization from Belgium to Germany grows stronger. In the annual review for 1993, Pharmacia Biotech can announce a formal reorganization and transfer of resources:⁶

By the end of the year, the legal structure of the business area had changed in several countries in Europe. The Dutch and Belgian organizations were merged into a Benelux operation based in Roosendaal, The Netherlands. The offices in Sweden, Norway, Finland, Denmark, Benelux, Great Britain and Austria now operate as branch offices of the newly formed Pharmacia Biotech Europe GmbH, based in Freiburg, Germany. Changes to the legal structure in the other countries within the European operation will be completed by the end of 1994. The European Headquarters will be relocated to Freiburg and Roosendaal by July 1994 from its current location in Brussels.

Concurrently, in the former Eastern Bloc countries Hungary, Poland and former Czechoslovakia, the limited sales activities are transferred from the company's own organization in Austria, to independent distributors in each country. In Russia, a separate, limited company is established.

Also outside Europe, the regionalization process continues throughout 1993. A new region, Region International, with headquarters in HongKong, is formed to more

⁶*Annual Review 1993*, p.11

efficiently exploit the potential in Asia-Pacific (excluding Japan), Latin America, Eastern Europe and the Middle East:⁷

The new organization not only brings increased efficiency and profitability, it also helps promote Pharmacia Biotech as a single global company with a strong identity.

Pharmacia Biotech's joint venture company in India is dissolved and replaced by a branch office. Another break in the tradition to handle sales by subsidiary organizations can be observed in Australia. Pharmacia Biotech's organization in Australia is taken over in 1992 by a local company AMRAD (Australian Medical Research and Development Corporation). AMRAD is taking over the responsibility for all future sales of Pharmacia Biotech's products in the distant Australian company, AMRAD Pharmacia Biotech, with strong links to the new regional headquarter organization in HongKong. Apart from the fact that the agreement with AMRAD is part of the ongoing change of international coordination, it is also part of another emerging interest in Pharmacia Biotech - an openly declared interest in forming cooperation strategic alliances...

A REVIVAL FOR STRATEGIC COOPERATION ALLIANCES?

For Pharmacia's biotechnology group, the 80s has been a troublesome decade in respect to the Group's cooperation alliances with external partners. In 1986, the process division's cooperation venture with Alfa-Laval - BioLink - ends in a failure. Due to growth and integration problems in Pharmacia and tensions with Alfa-Laval's already established alliance in Switzerland, Chemap, the large plans to establish a separate cooperation venture focused on industry scale process and equipment development, are abandoned. The same applies to a number of alliances affected by the LKB-Pharmacia merger from 1987 and onwards. LKB's alliance with the French manufacturer of separation media, IBF, is broken as a result of the merger - IBF being a competitor to Pharmacia in the media area. LKB's partnership with Gelman Sciences in the area of electrophoretic media remains, but is successively being weakened during the latter half of the 80s, as a consequence of Pharmacia's internal reorganization focus. Sporadic contacts remain though, in the early 90s.

The process equals that of Sebia S.A., LKB's partly owned French manufacturer of clinical electrophoretic instruments. Sebia is never integrated in the Pharmacia/Procordia Group, although formally a member of Biosystems 1990-1992. The company is sold in connection with the dissolution of the Biosystems organization. Internal forces within

⁷Ibid

Pharmacia's old biotechnology group fighting for the idea to turn the whole group more towards clinical customers and products for clinical research never manage to convince the management group. In the late 80s, the global clinical market is expanding and some in BTG acknowledge the fact that the established electrophoresis products and the FPLC system can be door openers into the clinical market. The decision to dissolve the contacts with and ownership in Sebia is a sign that this strategy is abandoned, at least for the time being.

Lastly, LKB's cooperation with Hitachi in the ultracentrifuge area is also dismantled. The venture concerns an uncertain niche area in which Hitachi has a number of larger competitors. In addition, Pharmacia and Hitachi have developed cooperation in other areas, e.g. software for molecular biology applications. No strong ties are broken when the cooperation with Hitachi in the ultracentrifuge area is dissolved.

The conditions for new strategic cooperation ventures are not the best as the biotechnology units enter the 90s. Attention is drawn to the continuous internal reorganizations. Uncertainties about the company's future technological directions in the front-line of the global biotechnology supply industry contribute to the uncertainty concerning strategic alliances. In the internal analysis of the company's organization and market position after the dissolution of Biosystems, the topic of strategic alliances receives little attention. However, in the strategy discussion of the January meeting with the management group in 1992, it is acknowledged that the company "has no strong alliances - and is a 'strategic loaner' and weak 'alliance maker' ".⁸ In the official annual report, it is acknowledged that the situation in the whole biotech supply industry is changing with respect to strategic alliances:⁹

...there is a general increase in the number of companies forming strategic alliances and corporate partnerships to increase their clout and market share.

However, the trend is far from clear-cut. Apart from the many established R&D contacts with private and public research laboratories in Sweden, in the USA and elsewhere, and a new, emerging view of suppliers to the production units, the actions of Pharmacia Biotech point to a continuation on the path of acquisitions and mergers. The company's major engagements in organizational changes during the 80s and early 90s have been coupled to acquisitions and mergers. Likewise, the formal acquisition and merger trend seems to continue also among Pharmacia Biotech's major competitors.¹⁰

⁸Marketing plans 920117

⁹Annual Review 1993, p.9

¹⁰The merger of Percin-Elmer and ABI being the most obvious example.

Pharmacia Biotech continues its expansion and product development through acquisitions. In 1992, a new acquisition of a small Norwegian, R&D based company can be announced:¹¹

Our focus on research and development into new and innovative products was underlined by the acquisition of the Norwegian company Dynochrom, whose work on synthetic monodisperse particles for chromatographic use will neatly dovetail with our other research into new chromatographic media.

The knowledge base and R&D activities of Dynochrom are being integrated mainly with the R&D work of Pharmacia BioProcess Technology.

In the coming year, in 1993, Pharmacia Biotech is able to announce cooperation ventures, but not involving any complex fusion processes. Together with a Swedish based company, Pharmadul, a new joint venture - PharmaFrac - specializing in the marketing and selling of modular factories for products from the fractionation of blood plasma, is established. The main markets for the customized solutions in plasma fractionation are in developing and newly industrialized countries. The second major cooperation venture announced involves Pharmacia Biotech Japan and is founded by the Ministry of International Trade and Industry (MITI) in Japan. As the only non-Japanese company, Pharmacia Biotech is invited to take part in two national research projects, including work on an analytical method for complex carbohydrates and a technology for analyzing DNA structure.

The Pharmacia Biotech management openly declares the intention of taking an active role in the restructuring of the dynamic biotech supply industry. The general development in 1993 points to two future areas where Pharmacia Biotech's positions- and also its competitors' - most likely need to be strengthened through continued acquisitions or strategic alliances. Firstly, the relatively small size of the largest biotech suppliers means that few suppliers are able to present broad assortments of supplies and media. The distribution analyses in Pharmacia Biotech have early indicated that the average customer order contains few order lines. Competitor analyses have also indicated that one of the major competitors, Sigma, has managed the situation by extending the product range, increasing the number of order lines per order and thereby lower the cost per order. For Pharmacia Biotech as well as for many of the merging competitors, distribution alliances which broaden the product assortments is one possible path for the future. Secondly, Pharmacia Biotech needs to strengthen the positions in the two dominating technological areas purification and molecular biology. In molecular biology, industry wide analyses indicate an almost infinite number of possibilities and future paths, both concerning

¹¹Annual Review 1992, p.9

academic research and industrial applications. However, any choice of niche area will be coupled with high risks and high costs for research, product development and production. Irrespective of whether acquisitions and mergers or strategic cooperation alliances are chosen, apparent signs in the industry point to an accentuated need for collaboration. Molecular biology research and development of new molecular biology based industrial applications is now the common, underlying driving force for the whole biotech supply industry.

On February 1995, Pharmacia Biotech continues on the road of acquisitions, when Hoefer Scientific Instruments, a San Francisco-based electrophoresis company is formally acquired and Hoefer Pharmacia Biotech Inc. is established. In the 90s, the low cost producer of electrophoresis instruments Hoefer is looking for a distributor in Europe, a low cost distributor to match the production organization of the US company:¹²

We were so heavily dependent on third-party distributors who simply took our landed costs and multiplied by two or three. Often they just priced us out of the market. But we didn't have enough bargaining power. So we decided to find an alliance partner who had the capability of distributing our products outside the United States. We wanted Pharmacia Biotech.

Meanwhile, Pharmacia Biotech is not satisfied with its electrophoresis business in the US market. The mature electrophoresis business is expected to be important when expanding in the fast growing DNA analysis segment. While Hoefer is looking for a distribution partner, Pharmacia Biotech needs a technology and distribution partner in electrophoresis, creating a stronger position in the global protein and DNA electrophoresis market. When Pharmacia Biotech and Hoefer start negotiations they build on a prior, minor distribution cooperation. The two companies meet in the negotiations during 1994, and it is decided to complete an agreement in which Pharmacia Biotech acquires Hoefer, as of February 1995. Hoefer Pharmacia Biotech Inc. with headquarters in San Francisco will successively take over the responsibility for instrument and applications development for the whole electrophoresis product range, but:¹³

Hoefer will retain independent legal and product identities and take on increased responsibility for the management of the expanded business.

Pharmacia Biotech takes another step towards strengthening the position in the important US biotech supply market.

¹²Interview with Chu, T.Z., President of Hoefer Pharmacia Biotech Inc., *The Annual Review from Pharmacia Biotech 1995*, June 1995, p. 18

¹³"A new global force in protein and DNA electrophoresis", in *Separations* (The International Magazine of Pharmacia Biotech), No. 11, p. 6

There are other signs that the period of heavy internal focus is complemented with a renewed interest in external cooperation alliances. The established area of cell cultivation products and micro carriers are to be discontinued towards the end of the 1980s. However, plans are changed and after contacts with remaining key customers, it is decided to keep the micro carriers and invest instead in more developed application support and broadened product range. In 1991, contacts are taken with the Japanese producer of complementary, so-called macro carriers, for cell biology, Asahi Chemicals. In 1992, a letter of intent is signed for cooperation and in 1994 the final agreement is closed. While Pharmacia Biotech can take advantage of Asahi Chemicals' technological competence and resources, and its strong position among Japanese users, the latter can now compensate its weak distribution abroad and make use of Pharmacia Biotech's new emerging, global distribution organization. In addition, during 1994 a technological alliance in the same product area is signed with an Austrian partner, Institute of Applied Microbiology in Vienna.

TOWARDS NEW TECHNOLOGICAL AREAS

During the 80s, the whole biotech supply industry has been affected by the impact that the new biotechnology has had upon the pharmaceutical and health care industry. Throughout the decade, pharmaceutical companies have used the development of recombinant DNA technology to produce both drugs and a number of diagnostic tests uniquely capable of detecting diseases. In the beginning of the 90s, industry analyses of the global pharmaceutical and health care industry indicate a general trend toward disease diagnosis and prevention, e.g. based on new types of vaccines. For the global biotech supply industry, this general change constitutes an important challenge. The pharmaceutical industry, e.g. clinical laboratories for routine analyses, will need apparatus systems to support the unique diagnosis of particular diseases. While Pharmacia Biotech's traditional engagements in purification technology and later molecular biology have been founded on the provision of research tools to researchers, the experiences with clinical customers performing routine analyses are limited. However, around the corner awaits a huge market for instruments, services and other tools to support clinics and health care customers in diagnosis.

A move towards molecular diagnostics will require any biotech supplier to make huge investments in the new technology. For Pharmacia Biotech, a decision to move into molecular diagnostics will mean that heavy investments in new marketing and sales will have to be made, and clinical and health care organizations' routine laboratories - complementing the present, established contacts with clinical research laboratories - will

have to be approached. It is also probable that new molecular diagnostics systems might require new procedures for charging customers performing the diagnostic tests. Decisions concerning what diseases that the diagnostics instruments and services should detect must be taken, and the many registration procedures normally not necessary when selling standard laboratory instruments will have to be handled. For most biotech suppliers, the capital and competence investments necessary will require most actors to look for strategic partners. In addition, for Pharmacia Biotech it might mean that new questions will arise concerning the links to the Pharmacia group's diagnostics units, now heavily specialized in allergy diagnostics.

For Pharmacia Biotech, in the beginning of the 90s it is not a question whether to enter or not to enter into molecular diagnostics. Through the sales of molecular biology instruments and systems, e.g. the company's A.L.F. system, to clinical organizations and laboratories engaged in research and in diagnosis, Pharmacia Biotech is already there:¹⁴

It is too late for a decision to enter molecular diagnostics - we are already in this area. The real question now is ambition level, opportunities and priorities.

Pharmacia Biotech's internal analyses mirror the signs of a technological shift in the global biotechnological-pharmaceutical/health care complex. There is an open, rapid transfer of basic biotechnological research to meaningful applications. Old questions are solved with a high resolution technology. Several disciplines belonging to the new biotechnology - analytical biochemistry, DNA technology, genetics, cell biology, clinical research - are combined and focused on genetic identification, diagnosis and prediction. The emergence of the Molecular Diagnostics Era can be acknowledged, introducing the genetic age to diagnostics and analysis.

Around the corner awaits also a differentiation of molecular diagnostics into key application segments, e.g. "molecular pathology", "molecular ecology", "molecular physiology" and "transgenics", with impact on routine applications in not only clinical but also veterinary, horticulture, food, agriculture, and environmental areas.¹⁵ In the early 90s, Pharmacia Biotech is confronted with strategic, technological decisions with significant consequences for future positions in the global biotechnology complex. There is a need to review priorities, decide future directions and cost expansion areas, secure partnership(s), and develop a greater clarity and focus within molecular diagnostics.

¹⁴Strategic Planning Meeting 920117

¹⁵Ibid, 920117

In another part of the Pharmacia corporation, a new venture is started, strongly positioned in the new, emerging molecular diagnostics area. A former BTG manager is appointed managing director for a completely new venture called Progene Lab AB in Uppsala. It is a new service laboratory for Scandinavia, making diagnostic tests based on molecular biological applications - a potential customer for future molecular diagnostic systems from Pharmacia Biotech opens up a new form of service operations....

STABLE PROCESSES OF CHANGE 1993; MAKING THE NEW CHANGES STICK

Intertwined with the continuing organizational changes in Pharmacia Biotech during the second half of 1993 - the organizational move to Freiburg and the creation of four product divisions - signs of a new processual stability and continuity can be perceived. Many of the change processes that have been started around 1990 are beginning to stick. Despite numerous stops and reformulations on the way, many of the outlined changes have now become part of the new Pharmacia Biotech's operations or are on the way to become institutionalized. Many of the ongoing marketing and distribution changes are going through a transition state, becoming part of the new intra- and inter-organizational routines. The uncertainty phase of these processes is left behind. The ongoing changes have been firmly accepted as part of the ongoing strategic reorientation, as summed up in 1995. (Figure 4.2)¹⁶

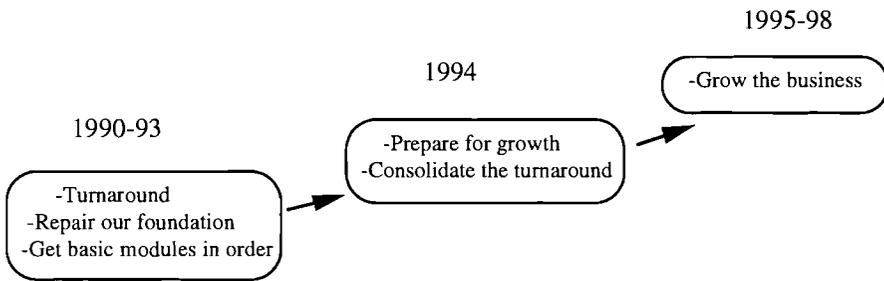


Figure 4.2. Strategic development process (Source: Pharmacia Biotech 1995)

When the regional manager for Europe in late 1993 summarizes the ongoing changes in the radically altered sales organization for the region, the prioritized change areas concern further improvements in both efficiency and effectiveness.

¹⁶As described in internal memos, April 1995

In all West European countries, except France, customers are connected to the new direct distribution system. For practical reasons - the French organization has the most complicated computer and software system to change - the customers in France are scheduled to be connected to the Uppsala distribution center for direct distribution during the first half of 1994. There remain operational problems to solve also in Spain and Italy. Administrative problems related to the customs clearance procedures need to be solved in order to be able to promise direct distribution within 24 hours also to the Spanish and Italian customers, and at a reasonable cost.

The change programmes for the technical after sales service activities are beginning to stabilize, much as a consequence of the fact that the internal routines for information exchange in the vertical channel are beginning to stabilize. Control routines are further stabilized by the successive standardization and implementation of new service management systems. The sales of after sales service contracts by the local technical service units is steadily increasing, beginning to form an integrated part of the local, key account adapted activities.

Coupled with the direct distribution changes, the complicated process of implementing a new, standardized EDI system continues. In the first steps of the distribution change program in Europe, the change into direct distribution cannot be started without the support of an integrated and more standardized information exchange system. The capital rationalization /distribution and EDI change projects in 1991-1993 are thus strongly interconnected. The first of two major steps in the EDI change project is finalized during this period. Due to the complexity and low degree of standardization of the old established Pharmacia system, it is necessary to start by modifying existing software. In order to be able to achieve a functioning communication between Uppsala, Brussels and the local companies before the distribution changes are implemented, the software in most European offices are modified, adapted and connected in the first phase. Some minor adjustments of existing hardware are also necessary in the initial step.

When the distribution change project takes off, the process of also changing the diversified hardware is started. For each new country and local subsidiary that is connected to direct distribution, local computers are exchanged for simple terminals. For security reasons, two computers are installed in the regional office in Brussels. In the first steps of the direct distribution change, UK, Holland and Belgium are connected on-line with computer number one in Brussels, which in turn is connected on-line with Uppsala. During 1993, Italy and Spain are connected in the same way, via new terminals to computer number two in Brussels. Towards the end of 1993, the EDI change process is

running and the first step is concluded, involving the modification of existing Pharmacia software, the introduction of terminals locally, including other, minor hardware changes, and the connection to on-line communications. The momentum gained in the process is used when step two in the EDI change is to be taken. Concurrently, responsibilities for the EDI change is successively being transferred to the regional organization in Brussels.

The plans for step two encompass a radical change of software throughout the European region. Despite the fact that the old software has been modified and adapted, it is necessary to continue the standardization of internal communication and administration procedures. Towards the end of 1993, the first attempts to implement new software are made. The Nordic countries and Holland are the first targets for the new software, and according to plans, the Nordic and Benelux regions are to be using the new software in the beginning of 1994. Basic customer information, addresses, billing information, etc. will first be introduced in the new standardized software package. Plans are to standardize and integrate later also the existing, newly introduced sales and service software packages. For example, within the realms of the ongoing after sales service projects, a number of the local service units are already in the process of implementing the UK organization's service administration system.

The efforts to improve further the efficiency of the internal, pan-European administrative routines are intensified as the go-ahead is given for the move from Brussels to Freiburg. The momentum in the rationalization process can be used as resources are moved to Freiburg and administrative tasks are taken over by the German organization. In the transfer process, the administration in the local sales organizations is cut down to encompass only cost accounting and pay roll administration, while a reduced number of cost controllers are placed in Freiburg to support the local branch offices. Other administrative units are established in Freiburg for centrally handling all customer ledgers, taxation procedures and treasury. All billing procedures for the European region in 1993-94 are being centralized to one administrative office, in Freiburg.

Responsibilities for other long-term change projects started in the early 90s are also being transferred and dispersed in the Pharmacia Biotech organization. Early in 1993, the Process Division is granted ISO (International Quality Standard) 9001 certification, after a long period of intense work to standardize, improve and document internal routines and quality standards. The process continues in the other Divisions in Sweden and USA in 1993. Certification for ISO 9002 is the next step, beginning in 1993. The Brussels organization can report a stable continuation of the quality improvement efforts. In late

1993, it can report that certification has been achieved by both the newly amalgamated Benelux operation and the UK. In the Nordic countries, start-up activities are proceeding.

Despite the fact that the regionalization process is taking new directions as the branch office concept is fully approved in Uppsala and the move to Freiburg is started, the transition does not create any severe disturbances in the vertical contacts between Uppsala, Brussels/Freiburg, the branch offices and the customers. The internal contacts and communications supported by EDI systems, continuous quality control routines, routines for daily direct distribution, and so on, support the stabilization of the new organizational change processes. In contrast to earlier attempts to redirect the operations and organizational structure, there is significant momentum and mutual reinforcement of the many ongoing changes. It is not so much a question of making things happen any longer. It is a question of more rapidly making the marketing routines that are changed stick in the organization, stabilizing the efforts of fine-tuning the many new procedures.

Around the corner, further new changes are waiting. The huge efforts to regionalize the European operations have meant an important shift in the internationalization process of Pharmacia's biotech company. The regional coordination continues in the Far East, but new tensions connected to internationalization need to be attended to. For example, the new Process Division (former Pharmacia BioProcess Technology) has for some years been struggling with the fact that many of the giant pharmaceutical companies buying biotech process systems for pharmaceutical production world-wide have been changing purchasing strategies. Coordinated purchasing procedures, global sourcing, is no longer an uncommon way to handle organizational purchasing activities in the industry. The change raises new questions in Pharmacia Biotech. Will the next organizational step be a move towards inter-regional changes and improved global coordination?

1994: CONTINUITY, CHANGE AND NEW TENSIONS TO DEAL WITH

In the beginning of 1994, the Pharmacia Biotech organization can look back a few years in time to compare the present, stable processes of change with the changes outlined during the critical period 1989-90. Most of the present changes can only broadly be acknowledged as offsprings of plans outlined four to five years earlier. The organizational as well as operational marketing and distribution changes outlined have been fundamentally transformed by the processes of change. Although dates can be artificially connected to some of the original ideas for change, the continuous transformation and interconnections and overlaps between the many projects make it difficult to acknowledge any clear beginnings or endings to the ongoing change

processes. In addition, the original organizational structure has been radically transformed in the process, including also Pharmacia Biotech's organization of external contacts. In 1995, the president of the company is able to acknowledge the positive sides of the preceding years and the timing of the severe downturn:¹⁷

Going into a downturn may not have felt like an advantage in 1990, when Pharmacia Biotech made its first operating loss in living memory, but the fact that the company was forced to start major restructuring five years ago put it ahead of rivals who didn't face difficult market conditions until several years later...It was not just a question of radically cutting costs, as many Swedish companies were forced to do in the early 1990s, by weaker markets and lost competitiveness. It also involved a fundamental reappraisal and reorientation of the group. One of the main aims was to make the company more of an industrial group and less oriented towards academia.

In 1994, there is considerable momentum in the many processes of change. Concerns about the internal contacts, procedures and efficiency improvements continue to draw the attention of the whole Pharmacia Biotech organization. However, as the change processes begin to stabilize, attention can also be directed towards other tensions, ambiguities, and areas for adaptation and change. The relative stability in the organization and a change from a situation of "panic" responses and survival, is slowly being replaced by rapid, but more continuous change which opens up the opportunity to extend both the time horizon and the environmental, market perspective. Concerns for the long-term strategic implications of and ambiguities connected to a move into molecular diagnostics and a new type of customers and customer relationships begin to occupy the organization. The increasing costs of expanding into new technological areas raise concerns about the lack of strong links with powerful alliance partners in the global biotech network. And, while the regionalization programs continue, questions regarding the next step in the process of establishing a truly global position are raised.

Pressures from the pharmaceutical groups continue:¹⁸

...trying to pass on some of the price squeeze caused by government health care spending clamp downs to biotech suppliers, there is also a squeeze on the academic/university side caused by reduced government grants for biotech research in Europe and the US.

Given this situation, the process to establish new relationships with the customers continues, taking the ideas of differentiated customer relations a step further.

¹⁷"Up front", interview with President and CEO, Pharmacia Biotech AB, *The Annual Review of Pharmacia Biotech, 1995*, p.7

¹⁸Ibid, p.8

LAUNCHING BIODIRECT 1995

The market and marketing reorientation process intensifies during 1994. Although the key account and customer differentiation ideas are beginning to stick in the organization in 1993, signs of a momentum in this change process are only beginning to emerge during 1994. The real take-off is expected to be in 1995, when the total, integrated customer reorientation and reorganization program is presented. The purpose is to take the marketing differentiation one step further and establish a marketing organization oriented towards key account customers and towards non-key accounts. The name BioDirect is given to the new marketing concept, referring mainly to the new service and support organization that will back up the contacts with non key accounts and key accounts. Despite a radical rethinking of the views of customers in the regions, there is still much work left to do according to the analyses performed in August-November 1994, when detailed plans are outlined. In the planning process, involving representatives from the new regional organizations and central marketing support, the need to standardize and coordinate the next step in the customer reorientation process is acknowledged: the regions and local sales units need to work closer with the customers, an organization with differentiated, multiple marketing channels needs to be implemented, the differentiation through more adapted added values to customers needs to be developed and organized, there is a need to move towards micro segmentation of the customers and establish routines which support long-term relationships, and the local organizations need to develop the ability to react faster to market changes and customer requirements.

The conclusions of the analysis and plans of November 1994 result in recommendations for four formal BioDirect projects: one in Piscataway for the North-American region, one in Tokyo for the Japanese region, one in St Albans for a start-up in the UK in the European region, and also one joint inter-regional task force with the purpose of coordinating the marketing reorganizations across the regions. The new project groups are set to outline detailed plans and start implementation of new marketing operations January-May 1995, with a joint meeting in June. An important part of the marketing reorganization now taking off is also to improve the quality of, and routinize, various types of communication and information flows, from the customers and back into all units of Pharmacia Biotech, and across the different regions. A number of new communication tools are successively being implemented during 1994-95 or are put in the plans for implementation (fax back services, BioDirect mailers, magazines, new catalogues, and other customer contact lines) The more detailed micro segmentation of the customers should also encompass efforts to better monitor different buying patterns.

At the BioDirect marketing meeting in June 1995, representatives from the sales regions meet in Uppsala to discuss the next steps in the marketing reorientation process. The meeting indicates that the customer reorientation process is firmly on the way to stick in the three major sales regions, although much remains to be done before the ideas and plans of the spring preparations are implemented. The Piscataway unit of the North American Region is in the middle of the process of introducing and fine tuning the many new activities. The UK project in St Albans is introducing a number of the new organizational and operational concepts and the process is expected to continue more intensely during the autumn.

The year 1995 seems to be, despite the regional differences, the year when the restructuring process and turn-around of Pharmacia Biotech's global marketing operations begins to stick. Given the history of the company with the last nine years of reorganizations and reorientation - despite the many new challenges that can already be perceived within Pharmacia Biotech - there are signs that the company is entering a phase of more stable change, much more in harmony with its moving organizational and business context.

5 Change Episodes and Marketing System Evolution: In a Context of Great Events (1941) 1959-1986

The six years from 1989 to 1995 saw more changes in the marketing and distribution operations in Pharmacia's biotech supply organization than had probably occurred in the previous thirty years. Not only the marketing organization, but every part of the whole, emerging Pharmacia Biotech organization had been affected by the many changes. When a tight network of researchers in Pharmacia and at Uppsala University in the late 1950s decide to turn the new so-called gel filtration method for laboratory separation into a business venture, the peak of organizational change in the early 90s would have probably been difficult for any of them to imagine. In the same way as the launching of the new chemical product, Sephadex, in 1959 is described as a very "daring venture" with ambiguous outcomes, the many organizational endeavours and ventures thirty years later become equally daring, and their long-term effects become equally ambiguous and difficult to predict.

In a seeming paradox, the complex and changing organizational context which can be discerned in 1995 tends to mask regularities and permanence in the biotech organization that have similarities with the situation three decades earlier. The ambiguities connected to taking the first steps into new technological areas and new internal and external organizational contacts remain, in light of the fact that the technological contents change. In retrospect, a move into the area of gel filtration in 1959 can seem distant from a possible move into the area of molecular diagnostics in the 90s. However, the general ambiguities and tensions and the general organizational endeavours show a remarkable regularity. Situations of this type have been continuously reappearing. The resulting responses, the actions and the behaviour of the people in Pharmacia Biotech, have not. The general problem of the biotech organization to find new ways to organize internally and to relate to other "internal" and "external" organizations - in the light of the

difficulties to delimit them - remains, but the behaviour and content of the actions to deal with them have changed over time.

In the early 90s, several circles are closed. Various organizational patterns in the biotech units return to a point which has a strong resemblance to organizational situations left long ago. The foreign marketing and sales organizations, which in many parts of the world had emerged from the sales of separation and purification products and services, had been linked over the years to other organizational sales units, e.g. to Pharmacia's diagnostics and pharmaceutical operations abroad. Now, in the 90s, after the dismantling of Pharmacia Biosystems and the creation of Pharmacia Biotech, the increasing independence of the biotech sales branches resembles in some respects the situation for the separation product units in many countries in the late 50s.

In a similar way other patterns seem to be repeated. The organizational ambiguities connected to the links between Pharmacia's biotech, diagnostics and pharmaceutical/health care units are amplified during the Biosystems venture. While many of the ambiguities are dissolved with the dismantling of Biosystems, they return in Pharmacia Biotech in a new shape, this time connected to another triadic relationship; that between Pharmacia LKB Biotechnology, Pharmacia BioProcess and Pharmacia P-L Biochemicals. Some of these organizational ambiguities are dissolved in 1993, when Pharmacia Biotech's new, more customer adapted organizational structure is presented.

Thus, circles are closed and patterns of behavior in Pharmacia's biotech organization return, however in new shapes. When changing perspective, conceiving of the whole history of the biotech company between 1959 and 1992, some aspects of change border on the motionless. Like in 1959, the organization, before the creation of Pharmacia Biotech in 1992, is still struggling with the same problems of how to establish a position - and what position to establish - within the Pharmacia conglomerate. The organization is not the same and the internal and external counterparts are not the same, but the general problem of creating a position in this inter- and intra-organizational network of organizations is basically the same after over thirty years. The organizational problems and endeavours in Pharmacia Biotech remain the same, but are taking new shapes. Underlying many dramatic events in the history of the company there is a slower movement, a stable, long-term, slow flow of technological and organizational change. The history of Pharmacia Biotech, until the reorganizations in 1993-1995, is filled with breaks and explosive events. Some leave important marks on the future development, while the effect of other events is limited to a short time span. Less easy to discern are the many slow, long-term changes in the company.

**MARKETING CHANGE EPISODES AND MARKETING SYSTEM EVOLUTION:
BUILDING ON AND BREAKING WITH A CHAIN OF GREAT EVENTS**

The Biosystems venture, the regionalization and key account process, the distribution and logistics change, and the after sales service change process emerging during the early 90s, all four build on and break with both common and unique parts of accumulating events in the history of Pharmacia Biotech. Figure 7.0. summarizes the chain of accumulating, historical events in which the late organizational, marketing change episodes became embedded. Hence, the different change episodes connect in different ways back to events of the past, while moving towards a new, future structure.(Figure 5.1.)

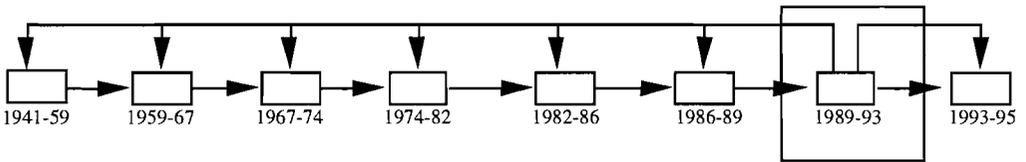


Figure 5.1. A chain of great events

The Biosystems venture, when grouping together the biotech, the diagnostics and the medical instrument units while definitely uncoupling from former pharmaceutical units of Pharmacia, breaks with the historical path set in 1967 and 1974 when three, technologically and organizationally interdependent divisions are established in Pharmacia. The Biosystems venture is in parts an open break with the established strategy and idea of internal "synergism" between Pharmacia's pharmaceutical, biotech and diagnostics activities and units, formulated during the latter half of the 1970s. (In reality, the internal links had successively become weaker during the 1980s.)

The regionalization episode breaks with the long-term internationalization process with nation-based, fairly independent market subsidiaries set during the late 1950s, when the net of European market subsidiary organizations begin to be established. In a similar fashion, the key account project of the regionalization episode breaks with several stable, old routines for handling customer contacts. The project also points ahead to the future reorganization in 1993-95, moving towards the integration of customer contacts for the laboratory, process and molecular biology operations.

As noted, the distribution project breaks with historical norms and routines set almost since the introduction of the first separation product in 1959. In parts, the distribution change episode becomes a definite break with the old "pharmaceutical" distribution tradition of Pharmacia, set in the late 1950s long before this event.

In a similar way, the after sales service episode breaks with the passive cost center tradition established in the mid 70s with the introduction of the first integrated product systems. Despite strong influences from LKB to break this tradition already in the fusion process from 1986, it is not until the changes take off in 1992 that a radical break with historical traditions can be noticed in the organization.

The marketing change episodes of the late 80s and early 90s become in parts turbulent processes of overcoming different facets of the emerging new company's history. Hence, the paths of development of the many, multifaceted marketing changes are partly explained by their temporal and contextual positions in the long-term historical process of change. With the focal, marketing change episodes in mind, we can now take several steps back in time to see how it all started. What were the processes and events that shaped the history of Pharmacia Biotech? How did the accumulating effects of a successive chain of "great events" come to influence the results and the development of the marketing change episodes? Following the division into three overall phases, built up around seven steps in a chain of important events (see picture above), the story can be restarted and condensed.

FORMING THE FOUNDATIONS FOR A NEW BIOTECH COMPANY (1941) 1959-1982**PROLOGUE 1941-1959: THE SCIENTIFIC DISCOVERY OF DEXTRAN AND GEL FILTRATION**

In the late 1930s, at the Department of Physical Chemistry and Biochemistry at Uppsala University, its leading professors, The (Theodor) Svedberg and Arne Tiselius are contacted by the Swedish sugar producer, Svenska Sockerbolaget. The department receives research grants from Sockerbolaget in order to investigate the molecular characteristics of certain substances of the sugar beet. The aim is to investigate whether these substances - the polysaccharides - effect the speed of crystallization of sugar. For Sockerbolaget, insights into the characteristics of the polysaccharides are hoped to help the company to speed up the sugar production process. The general trend in biochemical research at the time is an increasing interest in the study of macro molecules, such as proteins and polysaccharides.

The Svedberg, the head of the department and a Nobel Prize winner in 1926, had become famous world wide and awarded for having invented an efficient laboratory separation technique, the ultracentrifuge technique, based on the fact that different particles of different size sediment at different rates when exposed to a gravitational field. The Svedberg and his associate researchers had used and refined the insights from the beginning of the century that molecular weight could be used for separation of chemical and biochemical substances. Their progress in separation techniques - separation had long been and partly still remains at this time one of the major technical bottlenecks in chemical and biochemical research - forms the foundation and reputation for Uppsala as "the town of methods".¹

The Svedberg hands over the contacts with Sockerbolaget and much of the project responsibility to his successor, Professor Arne Tiselius, who in the 1930s had become internationally known for being the leading scientist behind a completely new type of separation technique, electrophoresis. A series of experiments had been performed based

¹ A historical description of gel filtration describes the background of gel filtration (and the subsequent launching of the new product Sephadex): "The beginning, or rather the roots, of the success story of Sephadex can be traced back to 1925. In this year, Arne Tiselius, at the age of 23, became the personal assistant to professor The Svedberg at the Department of Physical Chemistry, University of Uppsala... In 1937 Tiselius became the first professor of biochemistry at Uppsala University... At this time this institute probably had the best experimental facilities in the world for the study of macromolecules, with continuously improved ultracentrifuges and electrophoresis apparatus as the prime instruments. In this environment Svedberg and Tiselius established a tradition in methodological research and created what was informally to be called 'The Uppsala School of Separation Science' and which attracted scientists from many countries and disciplines." (In: Jansson, J-C., "On the History of the Development of Sephadex", *Chromatographia*, Vol. 23, No.5, May 1987, pp.361-362)

on the property of large molecules relatively similar in size and their electrical charges in different environments. When mixtures of substances had been exposed to electric fields, separation had been brought about allowing molecules to move in different directions at different speed. When Arne Tiselius receives the Nobel Prize in 1948, it is the second time the university department is awarded recognition for its work in separation technology. The widespread reputation results in their laboratories and work in Uppsala being known as "The Uppsala School of Separation Science". Svedberg's and Tiselius's work will lay the foundation for further steps in life science research: isoelectric focusing, laminar flow electrophoresis, gel filtration, ion exchange chromatography, affinity chromatography, hydrophobic interaction chromatography and more. In this work, Svedberg and Tiselius recognize early on that interaction with industry is vital to the development of their science area.

Early in the development, both Svedberg and Tiselius develop close contacts with companies and commercial laboratories outside the academic sphere to exploit and implement various new techniques and inventions.² Svedberg, for example, is engaged in the beginning of the 1940s in a number of projects for three related but technologically very different companies in the Stockholm region, all with a common ownership background; Liljeholmens Stearinfabriks AB, AB Kema and AB Stockholms Bryggerier. Together with the owners and the chairman of all three companies, wholesaler Robert Ljunglöf, The Svedberg takes the initiative to create a new independent, R&D based venture, Forskningslaboratoriet LKB, with Svedberg as scientific advisor and Ljunglöf as chairman. As operating director of the company is appointed one of Svedberg's assistant professors in Uppsala, Sven Brohult, who becomes an important personal link between the new organization and Svedberg's department in Uppsala. Brohult has difficulties in finding a common business idea for the three disparate companies, but his knowledge from the ultracentrifuge and electrophoresis techniques leads him to suggest a business venture which will commercialize the techniques and couple them with the three companies' industrial production experiences and traditions. In 1943, AB LKB Produkter is created with the purpose of manufacturing research instruments and chemicals for laboratories. The international, commercial success of the company's products, based on instruments for sedimentation, ultracentrifuge techniques, electrophoresis and later chromatography, gives the new company an export market share of 70 percent in 1948. The contacts with the Institute of Biochemistry (the new name taken in the 1950s) in Uppsala remains one of the crucial backbones of LKB.

²"Svedberg and Tiselius were both open-minded to cooperation with industry and this attitude led to several industrially oriented projects, especially during the war.", (Ibid, p.362)

Meanwhile, during the same period in the early 1940s, Arne Tiselius continues the work on studying the properties of different sugar molecules and substances. In 1941, a chemist graduated from the Faculty of Natural Sciences, Björn Ingelman is asked whether he would like to take part in the project. During the years that follow, Ingelman and his associate researchers engage in intense experimenting with the various sugar compounds. At one occasion, a high molecular compound consisting of pure glucose - a natural form of sugar - is discovered. It is dextran, a substance formed if a certain type of bacteria under certain types of circumstances is made to react with a sugar solution. The bacteria and dextran is considered a problem, while the presence inhibits the production of sugar. There is also a problem of tracing dextran due to its strong similarities with sugar. One of the ways to trace small amounts of certain compounds is to inject it on animals which generally develop antibodies linking to the substance and protecting the body. Experiments with dextran show that no antibodies are developed. Dextran can be injected without any harm to the body, according to Ingelman's findings.

Meanwhile in the department, Anders Grönwall has since 1942 been working on a project whose aim is to find a method to freeze blood plasma. In the war time, research has been directed at finding methods to handle natural blood plasma and to find substitutes for it. Grönwall's and Ingelman's respective findings are connected and it is decided to do experiments with dextran as a substitute for blood plasma. In 1943, the managing director of Pharmacia in Stockholm is contacted in order to see whether the company is interested in developing the new product.

The timing is good. Pharmacia's success with a traditional, chemical based pharmaceutical, Salazopyrin, for treatment of rheumatism, is by this time indisputable. The sales success of the product is the single most important explanation for Pharmacia's increasing export sales. It is decided that Pharmacia is ready to invest in R&D to bring forth another "block buster" product for the company, and the idea of developing a blood plasma substitute is considered a promising venture. After four years of experimenting, clinical tests and intense cooperation between the university department and Pharmacia, the new product, Dextran 6%, later renamed Macrodex, is launched. Pharmacia enters the dextran era. The compound will be the foundation for several new products, and the sales of the new medical product Macrodex becomes one the major driving forces behind Pharmacia's rapidly increasing exports. During the 1950s, Macrodex also lays the ground for many new organizational and operational principles for marketing, sales and physical distribution internationally.

In the shadow of the work on the new blood plasma product in the middle of the 1940s, the research initiated by Sockerbolaget continues at the university department in Uppsala. One of the tasks is to analyze the pectin contents of the sugar beet, and find ways to develop compounds with the ability to produce gel. In 1946, Ingelman who has discovered dextran a few years earlier, succeeds in producing the first gel by modifying dextran. Dextran molecules, chains of polysaccharides, are tied together by chemical cross-linkages to form a three-dimensional network resulting in a new gel substance.³ For various reasons (e.g. the concentration on the new product Macrodex), the result - manifested in a lump of gel containing more than 99,5% water - does not come to be used as a substitute for pectin. The sugar company is simply not interested in the products and Ingelman withdraws a patent application filed in 1946.⁴ It will take almost ten years before the discovery of the cross-linked dextran comes to be used, but now in connection with a completely different project within the department.

In the 1950s, the Department of Biochemistry intensifies its research in separation techniques, continuing its long tradition in this area. Efficient and effective separation of chemical and biochemical compounds remains an important bottleneck in biochemical research, and in the 50s, a group of researchers at the department continue on the path of The Svedberg and Arne Tiselius. Assistant Professors Jerker Porath (later appointed head of the department) and Per Flodin engage in experiments with methods where mixtures of substances are separated according to the size of their molecules.

Among the experiments, an old method discovered by a Russian botanist in 1911 is tried. A suspension of porous particles of a chemical substance is poured into a vertical glass tube, a column, or a cylindrical container with a tap at the bottom. Different solutions or mixtures are lead to flow through the separation media in the column. If a solution containing solutes of different molecular sizes is percolated through a certain type of media, the larger molecules which cannot penetrate the particles of the media pass more quickly. Different layers of different compounds become separated in the column. By around 1940, Tiselius turns his interest toward chromatography, and his Nobel Prize in Chemistry concerns his work on both chromatography and electrophoresis. This foundation for chromatographic separation are experimented with intensely by Porath and Flodin during the 1950s.

³Dextran molecules were reacted with so-called bifunctional reagents (e.g. epichlorohydrin) and insoluble, but water swelling product were obtained. (Ibid, p.362).

⁴However, the sugar company showed no interest in these products and this was the reason why Ingelman withdrew the patent application he had filed in 1946. In preliminary studies, Ingelman had noticed how a variety of substances diffused into and were retained by the cross-linked dextran gels and he envisaged their use in possible future pharmaceutical products. This is why he chose not to publish anything of his work with the dextran gels, a decision which would prove to be very foresighted indeed more than 10 years later.", (Ibid, p.362)

In the middle of the 1950s, Per Flodin and another Assistant Professor connected to the Department, Bertil Gelotte, are employed by the new, now Uppsala based, Pharmacia organization. The move to Uppsala signals an intensification of the contacts and exchange of researchers between the company and the Department of Biochemistry. Pharmacia invests in a new R&D organization, the so-called Research Laboratories, attracting researchers from the University. One of the R&D departments is devoted to the macro molecular field and Gelotte joins Pharmacia in 1955 to become head of Pharmacia's Biochemical Laboratory. The University's long traditions in separation technologies are beginning to be transferred to Pharmacia.

Porath's, Flodin's and Gelotte's cooperation on chromatographic separation is intensified. In the mid 1950s, Flodin starts experimenting with Björn Ingelman's old discovery, cross-linked dextran, as separation media. It turns out that this gel substance has many of the positive characteristics that are required of an efficient and effective separation media.

The cooperation between Porath and Flodin becomes the central link between the Department of Physical Chemistry and Biochemistry at Uppsala University and the Biochemical Research Laboratory of Pharmacia:⁵

In 1954 Flodin left Tiselius' laboratory to take up a position at Pharmacia and Porath continued the development of column zone electrophoresis in vertical columns, now with cellulose as the main packing material. The two colleagues, however, kept a close contact and met regularly to discuss scientific and other matters. Porath was not entirely happy with the cellulose powder which displayed a variety of adsorption effects and he tried several alternative convection suppressers. On the suggestion by Flodin in late autumn 1956 he also tried a powder obtained by grinding a block polymerisate of dextran crosslinked with epichlorohydrin..."

The cooperation continues and intensifies. Later, the managing director of Pharmacia, Elis Göth, consults the head of the Department of Biochemistry, Arne Tiselius, and it is decided that the discovery is to be given a project status. Dextran gels prove to be particularly suitable for chromatographic separation, and extensive experimenting at Pharmacia and the University becomes based on this finding. Two new patent applications are filed, based on the promising results of Porath and Flodin. In 1958, Pharmacia decides to start a product development project.

After several years of experiments, a new product and a new separation method is announced in May at a conference in Bruges, and in June 1959 in the scientific journal

⁵Ibid, p.363

Nature.⁶ The method is called *gel filtration* and the new separation media is given the name Sephadex (an abbreviation of Separation, Pharmacia and Dextran). The decision to introduce Sephadex as a new product for laboratory research will over twenty-five years later in a retrospective review be described as daring:⁷

It was an equally difficult as brave decision. It meant that Pharmacia would start production within an area where we had no former experience. The company knew that it was facing the task of building up a wholly new type of competence, and that only part of the existing production resources could be used. In addition, and this was perhaps the most difficult thing, one had to overcome the inner resistance; it was not considered first-rate to produce anything but pharmaceutical products.

Despite this internal resistance, it is decided to take the invention out of the laboratory, R&D context of Pharmacia and launch Sephadex as a product aimed for laboratory researchers.

1959-1967: EMERGENCE AND PRODUCT GROUP FORMATION

The start of the Sephadex era

Already before the launching of Sephadex, Bertil Gelotte and Per Flodin have been able to demonstrate the new gel filtration method to visiting researchers. These direct contacts between researchers, results in more than 200 articles on gel filtration being published in scientific journals between 1959-62, in 1964 they are more than 500. Gelotte and Flodin and a small number of researchers connected to one of three research areas of the Research Department, polymers research, become the internal, organizational origins of the separation products operations. The contacts with Uppsala University - for example, Björn Ingelman becomes supervisor of Pharmacia's total research on dextran - remain an important foundation. But also other individual contacts, internally to other research groups within Pharmacia and externally to other researchers, become important links to spread the news about gel separation and Sephadex. The small gel filtration research group is able to build on an established tradition, described internally by the

⁶The publication ("Gel Filtration: A Method for Desalting and Group Separation", *Nature*, June 1959) and launch is described: "We wish to report a simple rapid method for the fractionation of water soluble substances'. This quote is the opening sentences of the new classic paper by Porath and Flodin who, in 1959, introduced gel filtration as a practical separation technique. In retrospect it must be regarded as one of the most significant advances made in the methodology of biochemistry. It had an enormous impact, not only scientifically, where the speed and simplicity of the new method contrasted strongly with most of the separation techniques then available, but also commercially.", (Ibid, p.361)

⁷*Pharmacia 1911-1986*, jubilee book, p. 89, (transl.)

pharmaceutical research division of Pharmacia's Danish manufacturing subsidiary in 1963:⁸

We are consciously trying to concentrate our research effort on methods and systems which are useful for preparing and screening large numbers of new active agents. This means that our capacity for doing the more sophisticated study is limited. This we try to compensate by creating an international network of friends and contacts in institutions, companies, etc. with whom we can work together towards elucidating the underlying mechanism of our compounds. These friendships and this method of work have proved very useful to us already. We are trying to extend this type of cooperation and we think that ultimately not only the research people, but also our colleagues in the particular countries will benefit greatly from these scientific friendships and contacts. Your attention is called to this point specifically, because we should be very interested in having your cooperation in the matter. Whenever, you hear of somebody who is considered to be more than average in his special field, and whom you think would be capable and willing to carry out research for and with us, please let us know. By keeping your eyes open for this you will not only help us, but you will also help yourselves.

The same type of personal links and word-of-mouth mechanisms, mainly among academic researchers, become important also for Flodin's and Gelotte's small R&D group, and a complement to the growing interest caused by the publications in research journals.⁹ The small group's demonstrations at Pharmacia and in research institutions are crucial; biochemists have to be taught about the new separation method. However, unlike the discovery of the cross-linked dextran and the introduction of prior separation techniques, gel filtration comes into practical use very quickly. Within two years of the publication of the first reports it is already becoming known as an important biochemical separation method. Within Pharmacia, several reasons are acknowledged. Firstly, among chemical and biochemical scientists gel filtration becomes the technique which helps many of them carry out previously impossible separations. Secondly, during the late 50s and early 60s, there is an increasing interest in biochemical problems, and a need for improved separation techniques in this area. In addition, a number of established and new types of marketing efforts contribute to the fairly immediate success. In 1964, after a sales increase in 1963 of almost 60 percent compared to the year before, it is reported that:¹⁰

An important reason for the fast development of Sephadex business is the first-class marketing work of the sales organizations in various countries. It is always a great pleasure to see the enthusiasm and the interest with which the Pharmacia subsidiaries and agencies follow new developments and, in various ways, keep their customers up to date with accurate information.

⁸*Focus*, May 1963, p.7

⁹In the historical description of gel filtration this is acknowledged: "The creative and stimulating atmosphere in the laboratories of The Svedberg and Arne Tiselius in the Departments of Physical Chemistry of Uppsala University during the 1930s, 1940s and 1950s, was a nursery for a remarkable set of both academic and industrial advances. Their pupils were to be distinguished professors at Swedish Universities, as well as abroad, and they were directly involved in the development of two successful Swedish Industries, LKB-Produkter AB in Stockholm and Pharmacia AB in Uppsala...All the necessary components of a successful transfer of academic research to industrial product development were at hand: a scientific culture of common origin and a longstanding tradition in methodological research; mutual understanding and respect combined with informal links not just between the president of the company and the university authorities.", (Jansson, J-C., "On the History of the Development of Sephadex", *Chromatographia*, Vol. 23, No.5, May 1987, p.361)

¹⁰*Facta*, Sephadex News, May 1964, p. 8

This intensive and well thought out sales promotion has produced a steadily increasing sales volume in most countries.

However, the sales success and the diffusion of the new product and technique become coupled with marketing efforts which initially serve to complement the central Pharmacia researchers' personal contacts, mainly with academic researchers both in Sweden and abroad. Successively, the need to both adapt to and break with established pharmaceutical marketing traditions surfaces.

Spreading the news about Sephadex and gel filtration

Complementing the individual contacts of Bertil Gelotte et al within the biochemical sector of the academy in Sweden and abroad, much marketing work during the first three years is devoted to spreading information about the new technique. The small group of researchers available at Pharmacia and the small Export Department established in 1957 cannot rely on the direct and indirect personal contacts as the only channel for spreading the news. The reports in research journals are important, but are not enough. Advertising and participation in conferences are two additional ways of spreading the news in 1959-62:¹¹

We are continuously advertising in scientific journals, not only in the USA and Europe but also in Australia and Japan. One of our most important promotional activities is to participate in exhibitions.

In contrast to earlier pharmaceutical traditions, exhibitions for the chemical industry and for laboratory equipment become the most important. Thus, Sephadex and the gel filtration technique are introduced at six major occasions during the first four years, with reports back to Uppsala of a big interest among the participants:

ACHEMA, Frankfurt am Main, June 1961
 Vth International Congress of Biochemistry, Moscow, August 1961
 Salon de Chimie, Paris, April 1962
 Federation Meeting, Atlantic City, April 1962
 Laboratory Apparatus&Materials Exhibition, London, April 1963
 Federation Meeting, Atlantic City, April 1963

In addition, a number of courses on the use of Sephadex and gel separation are arranged by the Sephadex group in Uppsala. In November 1962, all European representatives - agents and subsidiary representatives - spend a week in Uppsala studying the product and its applications.

Requests for information from customers begin to pile up at local Pharmacia agents' offices and in Uppsala. In the period 1959-63, the Sephadex group in Uppsala sees the

¹¹*Facta*, May 1963, p.10

origins of a central customer support function to deal with the many information requests from potential customers:¹²

We are happy to find a very great interest in our Sephadex products all over the world. In order to make it possible to follow the development in this field, we have established a reference service. Most publications on gel filtration are referred by us, and these short summaries are distributed consecutively. This service has met with great approval, and we have at present no less than 9000 addresses on our mailing list.

Advertising, articles in research journals, participation in exhibitions and the central reference service complement the important personal networks of the twelve researchers engaged in continued Sephadex research in Uppsala in 1963:¹³

Today 12 people are engaged in this research at Pharmacia, and we are happy to have a close and valuable co-operation with several scientists in various countries...

The 9000 names on the central mailing list consist of a mixture of potential and existing users of the Sephadex and gel filtration. A large number of researchers have been introduced to Sephadex at demonstrations; the number of buyers is more limited due to the fact that Sephadex is sometimes still provided free of charge to potential researchers and institutions.

Introducing separation products in the emerging net of subsidiary organizations

The launching and start of Sephadex sales come to parallel and coincide with a break in Pharmacia's dominating marketing traditions; the period 1958-67 signals the take-off of the company's internationalization through the establishment of wholly owned sales subsidiaries. Sephadex is introduced in highly dynamic, local organizations. Complementing the already established American(1949), Finnish(1951), Danish(1955) and German(1958) subsidiaries, Pharmacia establishes new subsidiaries in Great Britain(1962), Canada(1965) and Norway(1966), including a separate subsidiary for the products in USA, Pharmacia Fine Chemicals(1961). Between 1959 and 1967 the major part of Sephadex sales is channelled through these new organizations, including also the rest of the Nordic home market. In 1967-68, 22 distributing companies in other countries also market Sephadex products, but the sales is still dominated by the foreign subsidiaries. Exports sales already in 1967-68 are estimated at 95 percent of total sales.

In the important American subsidiary, Sephadex is introduced by Pharmacia's Uppsala staff during several visits to Pharmacia Inc. in 1960. Pharmacia Inc.'s New York headquarters have been renting space in several offices in the city since the opening in 1949. In 1961, complementing the head office, Pharmacia Inc. also has a separate sales

¹²Ibid, p.10

¹³Ibid, p.10

and distribution center located in Rochester, Minnesota. With the introduction of Sephadex a new separate venture organization is formed in 1961, Pharmacia Fine Chemicals and a special sales manager for the product is employed. The product is virtually unknown to American scientists, but awareness of the product increases as they come to meet personally with the staff members from Uppsala.

In 1960-61, the first shipments of supplies of Sephadex from Sweden reach the US organization. Descriptive and promotional material complements the product. Sales are handled by the subsidiary Pharmacia Laboratories. In 1965, in a retrospective look it is acknowledged that:¹⁴

Initially, more Sephadex was given away than was actually sold; but the seeds had been planted. An awareness had been partially created, and the beginnings of demand were on the horizon.

In January 1961, a separate US subsidiary organization for Sephadex is created, Pharmacia Fine Chemicals, and its first Executive Manager is appointed in May 1962. Sales are still modest, but the American mailing list now numbers approximately 4000 addresses. Advertising is intensified and the increasing number of scientific papers becomes a good barometer of sales. The demand for Sephadex increases, and in 1962 Pharmacia experiences its first delivery problems and a taxed capacity to supply Sephadex. The US subsidiary employs additional technical and sales people (all with backgrounds in biochemical research) and:¹⁵

...expansion plans were established, so that eventually there will be sufficient sales personnel to divide the US. into specific territories and thus to enable regular servicing of present and potential large-volume users of Sephadex.

Between 1962 and 1965, the Pharmacia Fine Chemicals organization experiences the first signs of tensions between the still growing group of new laboratory customers and the already established users:¹⁶

Today the US. market for Sephadex continues to expand in two major directions. On the one hand the volume of new customers keeps increasing, whereas on the other, established customers consistently are using more and more of the product. In 1962 the average order was ten dollars. Today it is five times that, and in some instances single orders run as high as 2900 dollars.

The introduction of Sephadex, the rapid and steady increase of pharmaceutical sales, and the need to consolidate the headquarters' activities and the sales of the various products under one roof is accentuated after 1961. Two years later, the decision is taken to move to an integrated establishment in Piscataway outside New York. In 1964, the new

¹⁴*Sephadex News*, 1965, p.19

¹⁵*Ibid.*, p.19

¹⁶*Ibid.*, p.19

Pharmacia Inc. settles down in the expanding area near Rutgers University with a reputation in many scientific areas, attracting a number of giant US companies, Johnson&Johnson among others. Sales, distribution, administration, R&D and even production activities are integrated in the same building. The new distribution facilities with shipping offices and warehouse also include facilities for repackaging bulk shipments of Sephadex products. Immediately after the settlement of the new organization in Piscataway in 1964, planning for a new minor chemical plant for the production of Dextran and Sephadex starts. The same year, Pharmacia Fine Chemicals extends its sales organization, both to numbers and geographically. A new Sales Manager and a Technical Service Co-ordinator are employed in Piscataway, and the first Regional Sales Manager for Sephadex products is appointed for the Western Region, stationed in California.

In 1965, the small American organization's (around twenty people totally, including Pharmacia Inc.) steadily increasing Sephadex sales are almost as large as the rest of the world markets combined. However, the first 4-5 years of Sephadex sales have not been easy. As stated in 1965, "it had been a slow and tedious process". In 1965, the subsidiary also notes the first signs of competition, but counteracts with a number of new projects; separation kits with prepacked Sephadex columns and chromatography textbooks are marketed to college courses, and the US company's market survey lays the foundation for Pharmacia Uppsala's decision to start marketing columns. Unconnected to the Swedish organization's similar efforts to apply Sephadex to up-scaled, industrial production, the American subsidiary in 1965 also takes the first step into a new type of customer venture:¹⁷

...the staff is currently working with a medical centre and an industrial centre in assisting in the development of up-scaled operations employing Sephadex. These projects could result in an entirely new market.

After a rapid sales growth and increasing demand for the Sephadex products during 1965, Pharmacia Fine Chemicals takes the initiative to implement its first major marketing re-organization. Closer contacts with the geographically dispersed laboratory customers are needed:¹⁸

In order to meet these national demands and establish personal contacts with customers, the country is divided into three regions - Eastern, Mid-western, and Western. Each region is staffed by persons with both strong technical knowledge and sales backgrounds. Further assistance is given to this personnel by the Technical Service Department, which is equipped to do application research and provide customer service. These men meet a wide range of customer needs. They arrange lectures and seminars at the leading universities and institutions, work directly in the laboratory with customers, and display our products at the various national meetings.

¹⁷Ibid, p.20

¹⁸*Phocus*, June 1966, p.13

The US subsidiary keeps its position as Pharmacia's single most important sales organization for Sephadex and the number of sales and support personnel at Piscataway and in the three regions continues to grow in 1966 and 1967.

The German subsidiary which has been established in 1958 and starts its business in the beginning of 1959 becomes, together with the American and British subsidiaries, the major distributor of Sephadex during the first years after the launch. In contrast to the US organization, where the handling of Sephadex distribution is linked to the production and sales of dextran and the dextran based pharmaceutical product Macrodex, the latter product, and the follower Rheomacrodex, are successfully sold in Germany by the agent Knoll A.G. at Ludwigshafen. The sales of Sephadex by Pharmacia G.m.b.H. in Frankfurt is integrated in an organization primarily occupied with the sales of Salazopyrin and other non-dextran pharmaceuticals.

An important personal contact in Germany becomes Dr Determann of the Institute of Organic Chemistry in Frankfurt. Supported by his personal contacts with Gelotte et al in Uppsala he becomes one of the pioneers in gel filtration and an important marketer in Germany. The small sales unit at Pharmacia G.m.b.H. is supplemented in 1964 with one of his graduates and specialists in chromatography, Dr. Bende, who becomes responsible for the marketing and technical service of Sephadex in Germany. His task is to keep close contacts with institutes and industries interested in Sephadex and spend time in Dr Determann's laboratories of the Institute to investigate together with Determann and Uppsala questions regarding applications. Starting from a low level of sales, the sales figures are doubled both in 1963 and 1964. Participation in twoACHEMA conferences in Germany for the chemical industry - the second being the world's largest that year - become important market places for spreading the news about Sephadex. In 1967, the subsidiary staff of 25 people moves into new premises due to lack of space for storing the pharmaceuticals and the Sephadex products.

The British sister company Pharmacia Ltd. is opened in January 1963. The old importer and distributor Samoore Ltd. continues to distribute pharmaceutical products parallel to the new organization. During the first year, three people become responsible for all the fine chemicals, including their ordering, invoicing and despatch. Pharmacia Ltd. emerges as one of the most innovative and active concerning marketing, and becomes one of the first to describe and refine the very particular marketing situation that is connected to the sales of Sephadex, a situation that will put its mark on marketing during decades to follow. Pharmacia Ltd. soon realizes the fact that the sales people of the subsidiaries, the Uppsala based R&D group for Sephadex, local University laboratory researchers and

other users often collaborate intimately. Individuals and organizations appear in several roles; selling, using, developing, teaching gel filtration. The boundaries between R&D, application and marketing are not strict. Pharmacia Ltd. realizes this and in 1964 directs the Sephadex sales people to the importance of teaching as a strategic marketing method. Based on their experiences the Sephadex group in Uppsala announces internally that "a highly interesting way of selling Sephadex is to teach people how to use it":¹⁹

Obviously, if people do not know how to use Sephadex, or fail to make a success of their first experiments, then there are barriers to their use of the product - and a consequent loss in sales potential. Realizing that this problem was one of education, Pharmacia Ltd. has set out to deal with it in various ways. One approach involves a training course for workers new to gel filtration. So that a larger number of people could assist in this training, it was decided to run a course to "teach the teachers". This course was held in last October. It lasted two full days, and was held in the centre of London in the laboratories of the Biochemistry Department of University College...Of the thirty-eight people who attended the course, just over half agreed to run one-day courses at their colleges.

Selling and teaching Sephadex and gelfiltration through lectures, through the use of coloured film strips and through special news letters on Sephadex and its applications regularly sent to 3500 people on a mailing list are other important ways of marketing by Pharmacia Ltd from 1964 and onwards:²⁰

These activities bring Pharmacia into close contact with the research workers who are using Pharmacia products - and they sell Sephadex economically.

In 1965, the Sephadex sales group of the UK subsidiary moves into a separate office in the Pharmacia Ltd building, partly separated from the pharmaceutical group, while many of the other functions, including storing of products, remain integrated. In 1966, the rapid intensification of the activities motivates a move into new offices, twice the size. The internal separation is accentuated:²¹

We were fortunate, therefore, to get this so badly needed additional space last October. The whole of the existing open plan area was redesigned and partitioned with a separate storage room and adjoining office accommodation for the evergrowing Fine Chemicals section. The Medical Department had their own section.....

After Pharmacia's discontinuation of its agency contacts in Ireland, Pharmacia Ltd. takes over the marketing also for this area.

In 1965, the next sales company is opened in Montreal Canada. Initially, the long-standing collaboration with the agent Elliott-Marion Co. Ltd. remains, as the latter continues the distribution on behalf of Pharmacia. The promotion of Rheomacrodex and Salazopyrin is taken over by the new company, but the products continue to be

¹⁹*Phocus*, Jan 1965, p.21

²⁰*Ibid*, p.22

²¹*Phocus*, June 1966, p.8

distributed by the agent. The complete range of Sephadex products is marketed by the new subsidiary. In 1966, direct sales to customers start and the process of building up a central staff specialized in Sephadex sales is initiated.

Despite the large number of foreign agents that sell Sephadex in 1967 (22), the majority of the Sephadex sales are channelled through the new subsidiary organizations. The introduction of Sephadex in the many countries where agents by tradition have been marketing Pharmacia's pharmaceutical products come to vary much between countries. In some countries, the same agents that have been marketing e.g. Macrodex and other pharmaceutical products to hospitals, are appointed. Later this agency is also complemented with a specialized agent for laboratory equipment. This is the case in Switzerland when the central Uppsala Sephadex group introduces Sephadex through its established agent Opopharma A.G., and in 1964-65 adds another agent, Instrumenten-Gesellschaft, a rapidly growing company dealing with equipment for physico-chemical and clinical laboratories. In other countries the appointment of a new specialized agent immediately leads to the existing pharmaceutical agent's discontinuing Sephadex sales. This happens in Austria as the established pharmaceutical agent supplying also Sephadex, Contex Ges.m.b.H., hands over the whole sales responsibility for fine chemicals to the newly appointed agent, Unilabor Ges.m.b.H., in 1965. In some countries, Sephadex is introduced directly through a new specialized laboratory agent. This is the case in Spain where one of the two largest laboratory companies, Giralt Laporta S.A., is appointed Sephadex agent in 1964, and in Greece P.Bacacos, the largest laboratory company representing a number of other European and American companies within the chemical and clinical fields, becomes the sole distributor.

The growing importance of the Japanese market results in a visit in 1960 by the manager of Pharmacia's new export department(1957), Sven Boode. It results in an agreement with the Swedish trading house in Japan, Kjellbergs, and a licensing agreement with Green Cross Corporation for Macrodex and Rheomacrodex. For the Sephadex products a separate agreement is signed with an independent agent, Sikkagakku K.K.

The emerging central support organization for Sephadex sales 1959-1967

The new central support function originates from Pharmacia's polymer R&D department of 1959 built up by Bertil Gelotte and other former University researchers. Apart from their intense contacts with and travels to laboratory customers, exhibitions and subsidiaries and new and old agents abroad, the "Sephadex Group", as it is called, engages also the relatively, new central Export Department, with the manager Sven Boode and the export sales manager John Rönmark. However, in a period of rapid sales increase and expansion for almost all main Pharmacia export products, it is difficult for

the Export Department to give priority to the promotion of Sephadex, given the many other priorities and tasks; provide support to dextran licensees abroad, to provide service, support and promotion material for pharmaceutical sales, control of agents, sales education of medical sales representatives, and the initiation of clinical tests abroad for registrations. In 1962, as Bertil Gelotte is formally appointed leader of the Sephadex research group and the Department of Polymer Chemistry, the first separate sales manager for the Sephadex products is appointed, Gerhard Dirman.

In 1962-63, the small Export Department is reorganized and Pharmacia International is established to handle the expanding foreign marketing operations. The grouping of marketing areas, the need for a comprehensive description of its functions and the addition of new staff motivate the creation of a separate Division. The main responsibility is to handle the intensified contacts with both agents and the new emerging subsidiaries abroad. The contacts between the central Sephadex Group and the new division, Pharmacia International, intensify, with the joint visits to customers, exhibitions, agents and subsidiaries as an important connection between the two. Concurrently, Pharmacia International's Promotion Department grows, taking care of publications, collection of literature and different types of internal and external information.

In 1964, the separation product unit has outgrown its group status. It is time for the first outspoken divisionalization of the growing sales and support operations. There is need to openly signal that this line of business is quite different from the traditional, pharmaceutical business, and the central support activities for Sephadex products have to be consolidated:²²

During the past year the sales of separation products...have increased by more than 75%. The rapid development makes possible and indeed necessitates an expansion and re-organization of the research and sales departments dealing with these products. Partly because the line of products diverges from the pharmaceutical products, but mainly in order to concentrate the activities to one executive staff, Pharmacia's General Management has decided to constitute a Division within the company from January 1st 1965, to be responsible for research and marketing. The Division will operate under the name Pharmacia Fine Chemicals.

As President and Head of the Research Department is appointed Bertil Gelotte, while Gerhard Dirman becomes Vice President of Sales. Two new central Sales Managers for Sephadex sales in Region Europe (20 percent of total sales) are also appointed, complemented by a new Sales Manager for Eastern Europe in 1966. The coordination and collaboration with other units in the organization is stressed:²³

²²*Phocus*, Jan 1965, p.18

²³*Ibid*, p.15

Intimate collaboration between this department, the International Division and our foreign subsidiaries and agents will of course continue as before.

The need for continuous contacts between the new foreign marketing subsidiaries and the central Uppsala organization, lies behind the splitting of Pharmacia International in Uppsala as of January 1st 1967. In his new role as Vice President in Pharmacia AB, Sven Boode represents the Pharmacia AB management in its relations with the international subsidiaries outside the Nordic countries;²⁴

The creation of the new function must be seen as a result of the very successful and rapid development of sales and earnings in the Pharmacia International organization, necessitating more attention to the corporate structure of the various companies, to the building of competent staff and to the creation of efficient organization structures, and for canalizing and communicating a great number of problems which were of a less pressing nature in the initial phases of our expansion.

It is becoming evident that the subsidiaries need to be represented in the management of Pharmacia AB. John Rönmark takes over the responsibility for all remaining contacts with foreign agents and licensees as President of Pharmacia International.

The next important step in the reorganization of the central HQ organization for Pharmacia Fine Chemicals is planned for the latter half of 1966. It is acknowledged that the separation products activities including sales, research and production have grown to considerable importance and size. It is therefore decided that these activities should continue under a separate corporate structure. Consequently, the activities of Pharmacia Fine Chemicals, division of Pharmacia AB will from the 1st of January 1967 be taken over by a special unit called Pharmacia Fine Chemicals AB, with Bertil Gelotte as President. An internally recruited board of directors of five Pharmacia managers is appointed, including Gelotte and Sven Boode.

Sephadex production and distribution 1959-1967; internal tensions and growth

The start of the Sephadex era 1959-62 sees no major changes either in production or distribution. Both Sephadex and Pharmacia's infusion solution Macrodex and its complement Rheomacrodex are born from the same compound, dextran. The close connections between both production and physical distribution, including central and local storing and transportation often in the form of bulk shipments of the dextran based products - i.e. growing ranges of both clinical infusion and separation products - remain. Despite the fact that Sephadex is produced and distributed in the form of grains and later also as beads and the infusions as liquids in glass bottles, the physical similarities and the same laboratory and production origins make it fairly easy to integrate Sephadex in the existing production and distribution routines. The amounts of Sephadex bought by each new customer are in most cases small. As regards the physical handling of the products,

²⁴Phocus, Dec 1966, p.8

this has by tradition been a relatively neglected area in Pharmacia at the time. Pharmaceutical products have by tradition been stored in connection to the production and in the local sales organizations around the world, with little attention to logistical matters.

For the important American subsidiary and its customers, bulk shipments of Sephadex, dextran and Macrodex and pharmaceuticals, are transported with trucks to Hamburg for boat transportation to New York. Later, the US subsidiary invests in its own production unit for the manufacturing of Sephadex out of raw dextran.

Due to the rapidly increasing demands for both traditional pharmaceuticals (Salozypirin) and dextran products, Pharmacia experiences in 1962 the first severe delivery problems. There is lack of production capacity. Plans for 1963 are to expand radically the central laboratory space and build a new factory. The first stage in 1963 covers a new research and control laboratory and a new building for pharmaceutical production. The second stage in 1964 includes expansion of the chemical production facilities. The first floor of the new laboratory building opens in 1963 and is used only for the polymer-chemical research work:²⁵

Research work on products for gel filtration is at present carried out in premises which are too small. After the move into the new laboratory building the work on this highly interesting field will be greatly increased.

The first stage and the first new building also include on the ground floor a new centralized warehouse and despatch department for most finished goods in Pharmacia, with a ceiling height of 7 metres:²⁶

The concentration of stock in the new production building will lead to much more rational stock control than previously when it has had to be spread over the whole factory area.

The transfer of the stock into the new premises starts in 1963. During the following year, the second stage is finished; new production facilities for joint production of both Sephadex products and clinical dextran is opened in 1964. Towards the end of 1964, when the building program is finished, the dextran capacity is almost doubled.

1963-1964: radical break with established product and production traditions

The increased capacity for R&D and production of Sephadex products is coupled with a rapidly increasing product range. Already before the extension, R&D has resulted in a range of Sephadex gels useful for fractionation in several molecular ranges. In 1962, five types are available: Sephadex G-25, G-50, G-75, G-100 and G-200. All variants are

²⁵*Focus*, Dec.1963, p.5

²⁶*Ibid*, p.5

initially produced as grains, but are at the end of 1963 also available in bead form, which means a better flow rate in column separations. For the biological field, also a number of so-called ion-exchangers based on Sephadex are produced in 1962-63, and experiments are made also with thin layer gel chromatography. However, a radical break comes in December 1963, when the Sephadex group reports in its internal Sephadex News of "a new development":²⁷

As a result of the rapidly increasing use of Sephadex the interest in gel filtration equipment is also developing very fast.....As a result of this experience, Pharmacia decided some time ago to develop a laboratory column. You may already know about this new development. the final design of the column was developed after several years of work and experience gained by our Research Laboratories. The extensive knowledge has enabled our laboratories to develop a simple and flexible design.

Experiences from the early 60s have indicated, based on the great number of enquiries from users and potential users at exhibitions and demonstrations, for example, a rising interest in Pharmacia's demonstration columns, the chromatographic glass tubes in which the Sephadex gel is packed:²⁸

We can only assume from this, therefore that many scientists are not really satisfied with the chromatographic tubes used at present.

A minor market survey done by Pharmacia Fine Chemicals in USA influences the decision to design, produce and start to market a completely new type of product. But in the internal presentation of the new chromatographic tube the hesitation and uncertainty about the new venture is acknowledged:²⁹

The designing and manufacturing of such equipment is naturally, outside the sphere of Pharmacia's sales activities. There is however, a close connection between the developing applications of Sephadex and the equipment designed for this purpose. It is evident that there is a special need to produce "tailor made" equipment for our gel filtration chromatographic technique.

In the small laboratory at Pharmacia, with the help of simple lathes and supplies of commercially available, standard Pyrex glass tubes, the research groups construct an easily replaceable column. Fitted with a special top and bottom piece and also with a sample applicator, the new column can be adjusted to fit any bed height up to about 40 centimetres.(Figure 5.2)

²⁷*Phocus*, Dec. 1963, p.11

²⁸*Ibid*, p.11

²⁹*Ibid*, p.11

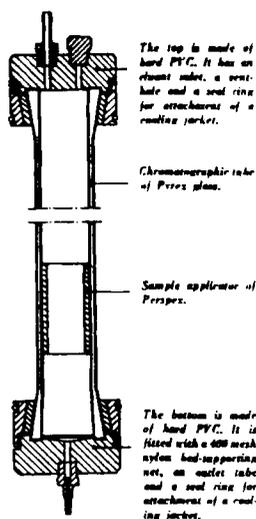


Figure 5.2. The first glass column

At theACHEMA exhibition in Frankfurt in June 1964, the Sephadex group in Uppsala together with Deutsche Pharmacia G.m.b.H. exhibit the first new Sephadex column, and announce that it will be commercially available within the coming year. Among customers with limited workshop facilities the new columns - initially intended as a standard column for gel filtration offered as a service to Sephadex customers - are reported to be "extremely well received".³⁰

However, it is soon discovered that customers' biochemical separation problems are often coupled to a wider range of problems concerning columns. Various preparative and technical columns are strongly requested. Intensive work in the laboratory work shop in Uppsala is initiated. Prognosis in December 1964 for the coming year is that the sales of the two sizes of columns developed will amount to 2000 units. In connection with the launching of a number of new Sephadex gels in November 1965, two new specially adapted columns are launched. Pharmacia Fine Chemicals is by this time definitely positioned in a radically new, non-chemical, non-pharmaceutical, type of product and production activities. In June 1966, it is confirmed that Pharmacia and its new separation product division is taking a step into a new type of production, as a new technical department - a column "factory" is opened in Uppsala.³¹

Chromatographic columns and other "tailor-made" apparatus to be used with our separation products will have increasing importance in the future. This seems to be particularly true of the development of the gel filtration technique on a semi-industrial and an industrial scale. For the design, development, and production of such products a special department has been formed. A floor area of four hundred square metres has been taken into use for the production and assembly of

³⁰*Phocus*, Dec. 1964, p. 13

³¹*Phocus*, June 1966, p. 11

the Sephadex columns. An experimental hall for testing large columns and for technical application work also belongs to this department.

The rapidly increasing demand for the new technical products exceeds expectations. It will lead to one of many important organizational changes in 1967-68, and takes Pharmacia and the separation products unit closer to the emerging area of instrumentation.

1958-1967: the second radical break - up-scaling processes and start of cooperation with Alfa-Laval

In 1958, one year before the launching of the first Sephadex product and the laboratory gel filtration technique, one of the researchers in the collaborative venture between the Department of Biochemistry at Uppsala University and the Research Laboratories of Pharmacia, Arne Emnéus at Pharmacia, is set to work with gel filtration on a larger scale. Bertil Gelotte et al early acknowledge the potential of applying the gel filtration method on industrial processes, for example in the food industry where the needs for desalting and for refined purification of food-stuffs has long been a problem. Experimenting with large 40 and 90 litre columns are started in 1958, later in 1963 a 100 litre column is tried, a 200 litre column in 1965, and later in the 60s, experiments with a 500 litre column are performed. At this time, rumours reach the UK and US subsidiaries that two different pharmaceutical companies in the two countries are experimenting on their own with 1000 litre gel separation columns.

After three years of experimenting, in 1962, the belief in large-scale separation is still strong but the technical difficulties are apparent. One problem concerns the flow rate which is too low. As experiments with Sephadex in bead form - complement to grains - are started, a solution to this problem seems to have been achieved. In 1962, it is reported from the Sephadex laboratories in Uppsala:³²

It is our hope that the gel filtration technique will be used not only on a laboratory scale, but also on an industrial scale. The industrial applications have, however, up to now been comparatively limited, but they are likely to be of topical interest with Sephadex in bead form, which means a better flow rate in column separations.

The simplest type of general separation problem is to separate very large molecules from small ones. One such practical problem concerns desalting, separating salt from proteins, for example. Similar types of problems exist in the dairy industry. This industry is by the time in the process of developing methods for desalting skimmed milk and producing various types of diet milk. Experiments with coffee also indicate that it is possible to separate aromas from other substances. Small scale experiments show that large-scale

³²*Phocus*, May 1963, p.9

separation might be used also in the pharmaceutical industry, for separation of hormones, enzymes, antibiotics, virus, and for separating different proteins in blood serum.

Despite intense experimentation and marketing efforts, Bertil Gelotte et al also acknowledge that food and pharmaceutical companies hesitate to commit to purchasing. Up-scaling problems are considerable, the required investments are big and more long-term in nature compared to the lab scale separations:³³

It is understandable that few companies show an immediate interest to invest money in large scale gel filtration ventures, despite successful experiments on a minor scale. A long-term investment based on successive step-wise up-scaling is necessary, paired with a strong belief in the method.

The American sales subsidiary has on several occasions come in contact with food companies and pharmaceutical companies that have shown interest in the new method. Contacts between the Sephadex group and food companies in Uppsala have indicated that the same interest exists in Sweden. One of the established suppliers of separation installations to farmers and to the dairy industry, Alfa-Laval, is well aware of the separation problems connected to the industry and in 1964 Pharmacia and Alfa-Laval come in contact concerning large-scale protein separation problems.

In 1965, a cooperation venture is started, a close collaboration to develop a method and equipment for the industrial use of gel filtration. The defined aim is to construct a pilot plant for preserving and purifying proteins produced from milk and whey, a process which is of interest to the dairy and foodstuffs industries. Two additional partners in the project become Alfa-Laval's collaboration partner, the Dairy Institute in Alnarp, and the food stuff company Semper AB. During three years, a pilot plant for production of low fat milk with a high degree of protein content and unchanged salt and milk sugar contents is developed. Negotiations with a potential customer, Götene Dairy, owned by Skaraborg county's regional dairy association, are started. In February 1968, the world's first large-scale gel filter is installed in Götene Dairy's factory. It is a 2500 litre fully automated gel filter with the capacity to purify 1500 litre of concentrated whey per hour. The installation is given the name Sephamatic System.

In the development process a number of different gel filters, varying in size from 75 up to 2500 litres are constructed. Medium-large gel columns of stainless steel - manufactured by Alfa-Laval - can be supplied as an aid in the production in pilot plant scale, but as noted in 1968:³⁴

³³*Phacta* 2, 1966, p.12, transl.

³⁴*Annual Report*1968, p. 18

As yet, they have had a limited appeal to customers chiefly within the pharmaceutical industry. The aim of the continued work is a gradual improvement of gel filtration media, a continued, technological development of apparatus and a supplementing with equipment for automatic control systems and process control. With such a target, Pharmacia Fine Chemicals AB hopes to be able to maintain its dominance within this special field and also widen the basis of its activities to penetrate adjacent fields of activities.

Despite the more difficult separation problems in the pharmaceutical industry - concerning separation of molecules of more similar sizes - attention is directed at this promising market. However, changes in the internal organization, including a radical restructuring of the production organization in the late 60s and unexpected consequences of the oil crises, on the spread of large scale separation in the 70s - resulting in rising costs for distilled water used with Sephadex gels - will result in only a handful of pilot plants being installed in Sweden, the UK, USA and Germany.

An important result is that attention is directed also at various types of medium-sized separation problems, i.e. gels and instrumentation for preparative, intermediate steps in laboratory separations. The contacts with Alfa-Laval remain, but it will take almost 15 years before they are formalized and develop into a deeper mutual business venture, Biolink. An immediate organizational consequence of the industry venture is that specialist groups are appointed both at Pharmacia Fine Chemicals AB in Uppsala and at Pharmacia Fine Chemicals Inc. in USA in 1968, to handle technological and sales questions in connection with industrial gel filtration.

1967-1968: growth problems and a number of important change events

The period around 1967 marks a number of important shifts in the history of Pharmacia's separation product operations. Apart from the successive but rapid growth of the organization during the 60s in almost all respects - production organization, central and local sales organizations, sales in almost all major product areas, R&D organization - a number of particular events will stand out as important for the future development.

In 1968, Pharmacia buys new land at Fyrislund in Uppsala, signalling the first step of a physical separation of most of the pharmaceutical and separation product operations. Concurrently, Pharmacia launches its first diagnostic test, an event which will provide the seeds of a new sister division in Pharmacia, to which the pharmaceutical and the separation products divisions will be connected both technologically and organizationally.

1967-1974: DIVISIONALIZATION, ORGANIZATIONAL EXPANSION AND FIVE IMPORTANT CHANGE EVENTS**Five important change events 1967-68**

Activities continue to develop at such a rate in the separation product organization that, in 1967, the step is fully taken to establish a separate division, a subsidiary organization, Pharmacia Fine Chemicals AB. Eight years after the launching of the first Sephadex product, the separation product unit is given subsidiary company status. This event, plus four other important change events in 1967-68, result in partly new directions for the separation product business. Several things happen that affect the operations both directly and indirectly. A second important event is the opening of a new factory for column production in Umeå, which becomes an important step into mechanical production and instrumentation. Thirdly, the cooperation venture with Alfa-Laval results in the first installation of industry scale process equipment with a new type of customer in the food industry. Fourthly, the period sees the birth and radical expansion of a new business area for Pharmacia, diagnostics. A new sister division is born and a new type of R&D, production and marketing activities are born and integrated in the Pharmacia organization. Lastly, the rapid expansion in all product areas - pharmaceuticals, diagnostics and separation products - necessitates heavy investments in new central offices and factories in Uppsala, resulting in a larger and more differentiated central organization. The enlarged and differentiated central organization, for Pharmacia as a whole and for the Separation Product Division, also affects the physical distribution activities, resulting in new, internal flows of instruments and chemicals with the old warehouses at the Boländerna area in Uppsala as central distribution point.

1967: the Separation Product Division gains company status and a new column factory is opened

As of January 1st 1967, Bertil Gelotte becomes the first Managing Director of Pharmacia Fine Chemicals AB. There are high expectations of the new company; in Uppsala there are openly expressed hopes that Gelotte and his associates "will be able to build up a new large company".³⁵

This event coincides with the planning for and start of a significant change in the internal production organization for separation products. When the assortment of chemical products processed in Pharmacia's chemical dextran factory in Uppsala is supplemented in 1964 with the production of simple laboratory columns for gel filtration nobody expects any major interest in the new products. However, interest in the laboratory columns presented at exhibitions is unexpectedly high during the first years. As demand by far exceeds capacity, it is decided in 1966 to build the new factory in Umeå, and like

³⁵*Phacta*, Jan. 1967, p.2

in Uppsala, the new factory becomes closely connected to the local University, to the local hospitals and also to one of the pharmaceutical competitors, Astra. In the autumn 1967, a wholly new plant of 3300 sq.m. for mechanical production is inaugurated with totally ten employees (to be compared to the 400 sq.m. workshop in Uppsala). The column production plant in Umeå is complemented with a minor research department, including laboratories for chemical and technological research. The new department initiates contacts with researchers at Umeå University concerning, for example, the development of new separation methods for micro biologists. Thus, in late 1967, Pharmacia Fine Chemicals AB has two geographically separated central organizations for R&D and production, one oriented towards chemical products and the other towards columns and other hardware. Central marketing remains situated in Uppsala. In late 1968, the Sweden based separation product organization has 85 employees, 46 of which are engaged in Uppsala and 39 in the Umeå production and product development operations. In 1968, 17 different products and in total 23.000 columns with a sales value of 3,5 Mkr are manufactured.

The new premises also contain a new warehouse for finished products, but the central warehouse in Uppsala remains the center point for Pharmacia Fine Chemicals' storing activities. Contacts between the two locations are established. Apart from a short intermediate period in the 60s when production and sales expansion forces Pharmacia to rent warehouse space in various places in central Uppsala, this is the first central differentiation and physical separation of warehousing activities. The increased need for information exchange between the two units separated by a distance of 700 km is acknowledged after the first year of production.

From columns to the start of instrumentation 1967-1974

The separation of mechanical and chemical production with the establishment of the column factory in Umeå, marks the start of a new product and production era. Although the Umeå organization initially becomes focused on the production of small, standard laboratory columns, the mechanical products successively become more sophisticated. A new range of products in-between the range of small laboratory columns and the large industrial Sephomatic columns is introduced in the late 60s. Laboratory separation often includes separation and purification in several steps, and a number of medium sized columns of 20-32 litres are produced for so-called *preparative* separation. In connection with this, a number of technical details become additional, standard components, making the columns more flexible and adaptable to different user situations, valves and flow adapters, for example. The first products to be added in the production of glass columns are accessories, extension cylinders to simplify the packing of gels.

Apart from the fact that the Umeå factory in 1968 manufactures columns from a size of 10ml up to 2500 litres, the move to Umeå is also the start of intensified research and development in gel filtration technology together with Umeå University.³⁶

Besides column production, which tends to embrace even larger columns, there will be a group of scientists working in close collaboration with scientists at the University. Research activities will be concentrated to further development of the gel filtration method and its application to biochemical problems, to development of certain industrial applications of gel filtration, and to studies of the new separation technique utilizing aqueous polymer two-phase systems. It is our hope that this extension of our research activities will bring us valuable information on our existing products and also yield new products for future sales.

The columns are successively being equipped with flow adapters, cooling jacket, stand and valves, in order to simplify and make more flexible the gel filtration procedures.

In 1968, gel filtration with Sephadex is already a widely used method in many biochemical and clinical laboratories, and training in the technique is being included in many courses in universities and schools. As a consequence of this, Pharmacia Fine Chemicals Inc. and the Swedish manufacturing organization launch a Sephadex Gel Filtration Kit for training and demonstration. The important customer group, the students and future scientists and potential users of gel filtration products, are equipped with a standard set of columns, Sephadex gels, dextran products and instruction booklets. However, like the few industrial Sphamatic installations, the organization is not adapted to the new customers and marketing requirements:³⁷

The interest in the kit has, in many places, already been encouraging, but it is obvious that such an education aid cannot be promoted in exactly the same way as our research products: we do not have the same support from international publications, congresses, and advertisements. Local advertisements and direct contact with education ministries, universities, and schools will probably be the most efficient way of introducing the kit. Our laboratory in the US. is planning a series of workshops and courses in gel filtration, where the purchase of a kit will be the fee for participation.

The chemical research has an interregnum in the development of new products during 1968. All research activities are concentrated to a few long-range projects. However, in the laboratory equipment area, a number of significant changes take place in 1969-1970 as decisions are taken to intensify the development of apparatus. Extension work is begun on the plant in Umeå and equipment for mechanical engineering and later also for electronics is invested in. In 1971, this is officially announced as the next important step in product development:³⁸

³⁶Bertil Gelotte, *Phacta International*, February 1968, p.3

³⁷Gerhard Dirman, *Phacta International*, September 1968, p.18

³⁸*Phacta International*, March 1971, p.8

It has been decided that Pharmacia Fine Chemicals will intensify and extend its activities in the apparatus and instrumentation area. Our experience of marketing and development provides an excellent base from which to extend our interest in the rapidly expanding instrumentation market.

It is decided to first try to cover equipment needs in biochemistry and other areas where the company is already working, and initially, attention will be focused on the field of liquid chromatography. In 1971, the small apparatus development department consists of only eight people with knowledge of both mechanics and electronics. But, as acknowledged:³⁹

...an extension to other techniques, and to other groups of potential users such as clinical and analytical chemists, is judged to be quite a realistic possibility.

An important breakthrough in separation technology development comes in 1971-72. Established separation techniques are mainly based on the different weights, sizes or electrical charges of molecules in different substances as base for separation. Based on intense R&D, Pharmacia Fine Chemicals now takes the lead in developing specific separation methods where the biological activity or *affinity* of the substances is utilized instead. It is known for example that a particular antibody can selectively isolate its antigen from a complex mixture; a reaction which forms the basis of various immunological and allergic reactions. The knowledge in affinity chromatography will later be the basis for renewed attempts to reach process scale users of chromatographic systems in the pharmaceutical industry, producing insulin for example. Viewed internationally, in the early 70s Pharmacia Fine Chemicals occupies a dominating position with regard to gel filtration technology. But the small company is beginning to enjoy a good reputation with regard to other separation methods. The product program lists chemicals and equipment for gel filtration, ion-exchange chromatography, electrophoresis, density-gradient centrifugation, cell and particle separation and affinity chromatography.

The individual contacts of the research departments in Umeå, Uppsala and Piscataway with researchers both in Sweden and abroad, together with the investments in new R&D and production resources in Umeå, have resulted in a range of new and more sophisticated products. In 1972, the product range thus includes gradient mixers, thin-layer gel filtration apparatus, and the automatic units for industry scale production. Still, the various products are to a large extent developed and sold as separate items and units. The investments in electronics competence in Umeå will, however, become one of the important steps towards an increased product system integration, a process that will take off later in the 70s.

³⁹Ibid, p.8

1967-1974: expansion and physical separation in Uppsala of Pharmacia Pharmaceuticals and Pharmacia Fine Chemicals

The opening of the new production plant in Umeå in October 1967 is followed by new heavy investments in Uppsala. A new chemical factory for dextran production is built close to the old buildings in the Boländerna area, the pharmaceutical division expands its production resources connected to the Danish subsidiary, and later in 1968-69 the American organization is also extended. Concurrently, plans are set for the construction of completely new offices, production plants, R&D departments and warehouses mainly for the pharmaceutical activities. Stage 1 of this major expansion of the central Pharmacia organization is started in 1968. With an average sales increase of 25-30 percent during the preceding years, both the pharmaceutical and the separation product divisions are in urgent need of new offices and plants. In addition, there are high expectations of the completely new product and business area, diagnostics.

The new central warehouse for pharmaceuticals at Fyrislund in Uppsala is opened in July 1969. The whole range of finished pharmaceutical goods, including cold stores, is transferred from the Boländerna area to the new warehouse at Fyrislund. The first limited attempts to introduce computer based stock control are made.

Successively, the pharmaceutical division moves into the new plants and the new R&D laboratories at Fyrislund. In 1972, the new Pharmacia head office is completed. Pharmacia Fine Chemicals AB remains at the Boländerna area and can now expand its central headquarters, chemical production and R&D activities in the former pharmaceutical premises. Internally, this is motivated by the Pharmacia management group:⁴⁰

The company(Pharmacia Fine Chemicals) is now an independent organizational unit, which does not need so much contacts with Pharmacia's other functions. Fine Chemicals, which is developing very fast, will within Boländerna have room for expanding research and development, production and marketing.

Pharmacia thereby takes another major step towards separation of the pharmaceutical and separation product activities.

...meanwhile, a new sister division is born: Diagnostics...

In 1937, Pharmacia signs a contract with the Dutch company Organon on cooperation on the production and sales of hormone based products. In the late 30s and during the 40s, Pharmacia manufactures some of Organon's products in the factory in Stockholm. The cooperation venture lasts over thirty years, until 1969, when Organon establishes its own company in Sweden. For Pharmacia - which among several products markets Organon's

⁴⁰Phacta, July 1970, p.29, transl.

hormone based pregnancy test during the 60s - the venture provides the company with the first experience in non-therapeutic, diagnostic aids.

Meanwhile, during the 50s and beginning of the 60s, it becomes obvious that the costs for documentation and registration of pharmaceuticals will steadily increase for all major pharmaceutical companies in the world. In addition, the development within therapeutic medicine in general has followed some "natural" or "logical" lines, which become obvious in the 60s. Whereas previously medical care has been confined to the problem of trying to hinder the course of some particular disease, now, owing to the progressive, systematic improvement in the art of treatment and its more timely use at earlier stages, medical care is at the stage where it often can cure patients completely. In the 1960s, it is taken a step further. Medical care becomes oriented towards preventive measures, developing methods to detect a disease in its early stages, including the warning signs before actual onset of a disease. Pharmacia, like other pharmaceutical companies becomes part of this general change in medical care and research focus:⁴¹

It is therefore necessary that increased efforts in research work be made to develop new diagnostic methods; and it is not surprising that the pharmaceutical industry is looking with interest at this area of activity so closely related to its own. An increasing number of pharmaceutical concerns - both in the USA and Europe - are naturally trying to gain a foothold in the diagnostic field.

Like with Pharmacia's pharmaceutical and separation product operations, the company's appearance in the diagnostics field becomes technologically connected to the foundations in dextran research, and in particular to the "side development" resulting in Sephadex and the separation product business. The diagnostics business becomes the concomitant result of the protracted dextran research and collaboration with various institutes at Uppsala University, the University Hospital and researchers in USA. One of the laboratory methods upon which Pharmacia comes to base several of the first diagnostic products involves the use of Sephadex. Another laboratory method which forms the basis of the company's first product in the diagnostic field, the Phadebas Amylase Test, launched in 1969, stems also from knowledge gained in the research work on Sephadex.

It is at the end of 1966 that the decision is taken to build up a biochemical R&D department with the aim of developing a series of new tests designed for use in clinical laboratory work. Research director Kurt Skagius and the sales manager for the hormone products, Carl-Erik Sjöberg, form the inner core of the new department. Other central individuals in the network that becomes involved in the new R&D venture are Leif Wide at the University Hospital, and Rolf Axén and Jerker Porath at the Department of Biochemistry at Uppsala University. Connections are established with research and

⁴¹*Phacta International*, October 1970, p.8

researchers in USA, e.g. Rosalyn Yalow's findings concerning antibodies and antigen reactions, the so-called RIA method, and researchers in the USA and Uppsala. Independently of each other they discover a new type of antibodies, named reagents, which can be used as indicators of different types of allergic diseases. In experimental research at Pharmacia during the late 60s, antibodies to this new substance called IgE are bound to certain Sephadex particles, forming the solid base for a new type of allergy test, Pharmacia's second major diagnostic test, the Phadebas IgE test. The product comes to consolidate Pharmacia's emerging position in the immunological and allergological field. Sephadex thus plays an important role in the development of a basic diagnostic technology named the RIST method, which comes to form the foundation for a wholly new business operation and a new Pharmacia company.

After the launching of the first diagnostic test in 1968-69, Pharmacia's new product group during the years that follow launches a number of additional tests worldwide. A large supplier of allergen extracts, Allergon AB, is acquired in 1971, and during the period 1969-74, the sales of diagnostic products exceeds all expectations. After several years of investment and intense research, the launching of products begin to bear fruit in 1970-71. During the next three years, the rapid growth results in the formation of a third new division to complement the pharmaceutical and separation product operations. In 1973, the diagnostics operations have 7 percent of total sales (14 from separation products, 75 from pharmaceuticals and 4 percent from other products), which gives a sales increase of 102 percent from 1972. Sales of diagnostic tests continue to almost double annually during the first half of the 1970s.

...and new types of customer and sales and marketing problems...

Pharmacia's branching out into the field of diagnostics is another step in the diversification policy of the company. However, the sector is intimately associated with the original, pharmaceutical product lines of the company. In hospitals, specialized laboratory staff are responsible for handling different types of diagnostics, a large field in which Pharmacia at an early stage chooses to concentrate development on diagnostic aids that are a combination of reagents and isotopic tests. Hospital doctors and clinical laboratory researchers become the new customers. Some of Pharmacia Fine Chemicals' separation product customers already belong to the group. The fact that diagnostics and preventive care is new, causes Pharmacia to focus on the blurred boundaries between education and selling - "we must teach doctors much more about preventive care" - when discussing the problems of marketing. It is acknowledged that:⁴²

⁴²*Phacta International*, April 1969, p.9

We shall encounter a relatively unusual problem both in connection with the marketing of diagnostic products and in assessing sales prospects for planned projects....It is often not possible to know whether a particular new laboratory method will have any sizeable clinical application before tests have been made on a large scale; this in turn, demands that the product must already be available....This state of affairs means that where new diagnostic methods are concerned, we must look upon ourselves as missionaries in the field. We must spread knowledge both about the technical aspects of the new laboratory aids and also on their usefulness in the clinical field.

This also means that the existing and new emerging sales subsidiaries' marketing organizations need to be further diversified; the pharmaceutical and separation product sales representatives must be complemented with a number of additional sales people/consultants specifically oriented towards the new customers, the clinical laboratories. Initially, sales can be handled by existing, pharmaceutical sales units. As the operations grow, wholly new sales units have to be built up. In the early 70s, the process coincides with the continuing expansion of Pharmacia's net of sales subsidiaries, some of which will be built on diagnostics sales as an important backbone of the new organization from the outset.

New and growing subsidiary organizations

In 1967, the bulk of Pharmacia Fine Chemicals' products are sold by and distributed from the foreign sales subsidiaries in USA, Germany, United Kingdom (incl. sales in Ireland), and Canada. The Swedish home market accounts for 5 percent of the total sales of MSEK 12.8 in 1968. The other Scandinavian countries and the foreign agents account for a minor share of the 95 percent foreign sales. In 1970, foreign separation product sales account for 98 percent. (For diagnostics and pharmaceuticals sales combined foreign sales account for 70 percent). A large share of total sales are handled by the American subsidiary, Pharmacia Fine Chemicals Inc.

In a second wave of international expansion, starting early in the Spring 1973, a number of new subsidiary organizations are formed. Pharmacia (Japan) K.K. in Tokyo is organized in close collaboration with two of the companies that hitherto have represented the parent company in Japan. Sven Boode of the Export Department had visited Japan as early as 1960 and been in contact with potential agents for the dextran based products, including Sephadex. Among Swedish exporters, Pharmacia becomes one of the pioneers in the Japanese market. Since the early 60s, the Swedish trading corporation Kjellbergs has acted as intermediary between Pharmacia and the licensee Green Cross Corporation for Macrodex and Rheomacrodex, and the agent Seikkagakku K.K. for separation products. In 1973, the agreement with Kjellbergs is discontinued and in collaboration with the licensee and the agent Pharmacia opens its own subsidiary in 1973. During the same period, Pharmacia establishes a small Australian subsidiary, Pharmacia(South Seas) Pty. Ltd. in Sydney.

One year later, in the Spring 1974, a new subsidiary is formed in France, Pharmacia France S.A. This company is initially assigned the task of marketing Pharmacia's diagnostics and separation products in France. Thus, the agreements with the local agents are discontinued and for the first time, diagnostics and separation products form the common foundation for a new sales organization. Later on, the new French organization will also market new pharmaceuticals developed within the pharmaceutical group. Established pharmaceutical products are still distributed by the local agents, but successively the responsibilities are taken over by the new organization. During 1974, an office and a new subsidiary is also opened in the Netherlands for sales in the Benelux area, Pharmacia Benelux B.V. In contrast to the French subsidiary, the Benelux office is initially responsible only for sales of Pharmacia Fine Chemicals' separation products.

The radical expansion in all three product areas - pharmaceuticals (mainly Macrodex, Rheomacrodex and Salazopyrin), separation products, and diagnostics - also gives the major subsidiaries growth problems. Investments in new offices, warehouses, and in some countries also in production plants (e.g USA, Germany, Denmark) come to characterize the period 1967-74. The American, British and German subsidiary organizations are those which are affected by this rapid expansion.

Problems of maintaining efficient distribution and regular contacts with separation product customers; the German case

The rapid sales growth in all product areas causes organizational growth problems in several sales subsidiaries. From the setting up of the German subsidiary in 1958 and during the next two decades, Pharmacia's German sales organization has to move four times; starting in Bad Nauheim, moving to Frankfurt am Main, moving within Frankfurt to new premises in the late 60s, and finally settling in Freiburg. The growth problems in the German organization, like in many of the other subsidiaries, is not only connected to the lack of office space for the growing sales organization, but is also related to the fact that warehouse space is rapidly becoming inadequate. In Germany, like in most countries, Pharmacia's export activities and internationalization have been driven by the sales of pharmaceuticals; Salazopyrin and the two dextran based products Macrodex and Rheomacrodex. In accordance with pharmaceutical distribution traditions, the products have been transported from the factory in fairly large shipments, initially with no regularity. Products have been stored in the subsidiary organizations near the clinics and hospitals and in connection with the actual users. The Sephadex products have later also been integrated in this distribution tradition, with the exception of the American subsidiary which has its own production and packaging of Sephadex products.

When new products successively are being added to the existing product range, including Pharmacia Fine Chemicals' glass columns, Deutsche Pharmacia experiences in the late 60s how the growth of stocks leaves the organization cramped for warehouse space. In 1968, the managing director of the subsidiary describes how the expansion creates problems, and how the storerooms and warehousing have been a problem already from the beginning:⁴³

We would prefer to remain here, but soon the space we occupy will be insufficient. This is particularly true of our warehouse which is in the basement and garages of the house, and which is now filled and utilized to the limits of its capacity. A rational organization and administration (e.g. using fork lift) is impossible in these unfavourably designed premises. Soon we will have to move.

A year later, after the move into new premises in Frankfurt, the situation has improved:⁴⁴

We moved into the first floor of a seven-storey office building in an area of Frankfurt convenient to transportation. Since the warehouse is now under the same roof, there will be a marked increase in the efficiency of our work.

After ten years as Pharmacia's sales subsidiary in Germany, it is also time for the first radical improvements in administrative routines:⁴⁵

While a simple manual copying system was sufficient in the first few years, the bookkeeping system had to be changed three times since.....the department on January 1, 1967, introduced mechanized bookkeeping..., since 1968 the open-item system has been used, and since April 1, 1970 we are taking care of bookkeeping, invoicing, stock control and statistics by means of punched cards via a computer. Things went similarly with purchasing. While we led a sort of hand-to-mouth existence in the first years, rising sales and more complex budgeting caused us to make operations more systematic and efficient. B.L. introduced a new ordering system and systematic order processing in 1968, which will suffice for many years to come....The short history of Pharmacia in Germany can be seen as a dynamic series of changes...

The expansion in the German market also leads to growth problems in the sales organization, a process which is connected to an increasing diversification of pharmaceutical and separation product sales.

As regards Deutsche Pharmacia's pharmaceutical sales activities, the fact that the company is only very small (with regard to turnover around the two-hundredth place in 1968) in Germany, leads the organization to direct its sales efforts to creating stable contacts with the central clinics, focusing sales on few products. The dominant sales tradition among pharmaceutical companies at the time is based on a large number of sales representatives interacting directly with a large number of doctors. Deutsche Pharmacia with only 12 sales representatives in 1968 chooses another strategy:⁴⁶

⁴³Dieter Kiene, *Phacta*, October 1968, p.15, transl.

⁴⁴Frank Baumeister, *Phacta International*, October 1970, p.5

⁴⁵Dieter Kiehne, *Phacta International*, March 1971, p.19

⁴⁶Dieter Kiehne, *Phacta International*, September 1968, p.9

We have obtained a foothold in the teaching clinics.....Our efforts are at present almost entirely limited to teaching hospitals. We have 12 scientific representatives who make an average of three visits per year to each teaching hospital.

After 1970, the pharmaceutical sales organization has to expand and go beyond the clinics and try to reach the general practitioners. After a local test in Frankfurt in 1968, Deutsche Pharmacia starts to build up a large field organization for this purpose. Concurrently, the sales of Sephadex and the separation products takes another direction while having to handle other types of effects of the expansion. It is difficult to keep up the necessary personal contacts with customers:⁴⁷

For lack of personnel we are not in a position to visit customers and advise them on their separation problems regularly. We still manage to establish personal contacts with many customers. If a customer calls us in for consultation, we make it a point to visit, if possible, all other customers in that town and to advise them. We find that we are considered welcome discussion partners. Frequently, a customer will direct us to his colleagues who are also having separation problems. Many other contacts are made during the ACHEMA Exhibition for Chemical Equipment, which is held every three years.

A partial solution to Deutsche Pharmacia's problem of keeping regular contacts with a growing number of laboratory customers is to invest in a new, central demonstration and application research laboratory in the new office building:⁴⁸

The staff of the Sephadex Department are especially pleased with their new application research laboratory. It will also serve to carry out test separations so as to improve our advisory work with customers. It will be easier now to set up practice seminars and lectures. Having our own lecture room permits us to prepare seminars swiftly, and with the lab close by they can be run in a scientific manner.

In the new application laboratory, Deutsche Pharmacia can now also make test separations for customers. The investment is the first step in building up a new type of service support organization in Deutsche Pharmacia's separation product department, to complement the existing sales group. Large central application support units will become characteristic not only for Pharmacia's German separation product organization, but for all subsidiaries in Pharmacia's international net of sales organizations.

Adapting the organization to new separation product customers; the US case

Despite the limited number of industrial customers adopting the up-scaled Sephamatic System, the first steps to create specialized sales units for industrial sales are taken. Beside the small, central R&D, manufacturing and sales units in Umeå and Uppsala in the early 70s, an emerging specialization can also be observed in the large sales subsidiaries. In January 1970, it is announced that Pharmacia Fine Chemicals Inc. in the USA has appointed its first manager for a new Industrial Department in the Piscataway office. The

⁴⁷Ursula Hergt, *Phacta International*, March 1971, p. 23

⁴⁸Frank Baumeister, *Phacta International*, October 1970, p.5

new manager will be responsible for the sales, installation, and servicing of Sephamatic Systems in the USA.

After the first installation in a food production company in Sweden in 1968, the American subsidiary is the first to launch the automated gel filtration system, installing stainless steel Sephamatic Gel Filters. Four large industrial customers in the USA are using the system in the early 1970s. The collection of customers reveals a general shift also in the application of the up-scaled Sephadex separation products; while food companies have been the first to adopt the gel filtration process, the interest among pharmaceutical companies is steadily increasing during the period. The "new biotechnology" is entering the scene. Within the drug industry, the need for separation techniques increases in pace with the use of enzymes, hormones and other biologically active substances as raw materials of drugs. However, in the beginning, it is above all in the production of insulin that Pharmacia Fine Chemicals' industry scale apparatus and methods come into use. During the first half of the 70s, a large part of the world production of insulin is purified by apparatus and methods from the company.

In 1970-71, the new, small Industrial Department in Piscataway has four industrial customers with which it develops contacts; one food company and three pharmaceutical companies: Foremost Foods, Chas. Pfizer & Co., Eli Lilly & Co., and Dade Reagents.

In the US subsidiary as in many of the other subsidiaries, the early 1970s sees the start of a more apparent customer differentiation:⁴⁹

What are the prospects for the future? The market so far for separation products, chiefly research institutions and institutes engaged in biochemical research, is growing rapidly and the rate of increase will probably continue during the next few years. But new markets are discernible. The basic technology and the products developed by Pharmacia Fine Chemicals are now being used more and more also with regard to different kinds of analyses, e.g. within clinical chemistry. Another area with high potential is industrial application.

Thus, both within the area of laboratory applications and industrial applications, a differentiation of customers and customer contacts is beginning.

Reorganizing the central support unit and the contacts with subsidiaries and agents
The increasing international expansion of Pharmacia's organization and the rapid growth of the central organizational units, cause the company to look over its marketing organization. A thorough study of the whole marketing organization is carried out in

⁴⁹Annual Report, 1972, Appendix

1970. Arising from this investigation a new organization is introduced at the turn of the year:⁵⁰

The principle change is that the sales side has now been co-ordinated into a marketing division with substantially enlarged resources. We hope that this new organization will be more effectively able to meet the requirements demanded by an increasingly international pharmaceutical industry.

The previous organization has functioned for more than ten years, since 1959, when an organization of five separate functions was formed: Production, Research&Development, Economy, Nordic Sales and Export Sales (later renamed Pharmacia International). Although this organization has been greatly modified since 1959, it still retains its basic structure in 1970.

Apart from the fact that foreign sales for the Pharmacia Group have increased on average from 42 percent to 71 percent (95 percent for Pharmacia Fine Chemicals), and that the number of employees has increased from 450 to over 1300, a number of other factors motivate the reorganization. These other factors are strongly connected to the pharmaceutical and diagnostics activities, and less to the separation product business:⁵¹

Not only has Pharmacia developed in itself but its relations with the community have also changed and are expected to change even more in the 1970s. Private enterprise and the community are becoming increasingly interdependent as industry takes on new responsibilities within the community. Rapid technical developments in communications, information handling and the processes of decision making, together with the ever increasing level of education and attainment of employees, create new possibilities for effective management.

It is stated that the rapid changes "lead to the demand for a new and more flexible kind or organization". Thus, in 1971, it is planned that the new organization, over the next three to five years, will be developed into a product group organization with pharmaceuticals, diagnostics, and separation products. Each product group will be an independent profit centre, according to the plans.

The most obvious organizational changes in 1971 concern the central marketing organization of pharmaceuticals and diagnostics. However, the reorganization indirectly also comes to affect the separation product operations. The new organization - to a large extent a transitional organization - becomes an intermediate step leading to a major reorganization and divisionalization, effective as of January 1975. The organizational change in 1971 results in a further uncoupling of the international marketing responsibilities for pharmaceuticals, diagnostics and for separation products, and also a differentiation in the contacts between Uppsala and the foreign marketing organizations.

⁵⁰President Gösta Viriding, *Phacta International*, March 1971, p.1

⁵¹Ibid, p.2

Sven Boode, the former Export Manager, is appointed Executive Vice President of Pharmacia and President of Pharmacia Fine Chemicals AB. But most importantly, he becomes responsible for the coordination and overall development of existing and new subsidiary companies. Furthermore, as stated in the description of the new organization "Sven Boode will also be responsible for intensification of the build-up of international business contacts".⁵²

The overall responsibility for contacts with the subsidiaries is separated from the marketing contacts. All international marketing support is brought together in one division and by dividing the responsibility on the basis of product groups, it is ensured that product specialists become responsible for the marketing of a single product throughout the world. The new intermediate, product based marketing organization still operates under the established name of Pharmacia International, with John Rönmark as Vice President (Marketing). The division also has other responsibilities:⁵³

The new Division will also have increased opportunities for taking an active part in the development of new products.

A number of specialized functions are formed within Pharmacia International: Pharmaceuticals, Diagnostics, Sales Regions, Marketing Service and additional staff functions. The Marketing Diagnostics function is formed with an explicit aim; it is established with a view to the formation of a future separate diagnostic product group. In addition, a regional grouping is made with four specific Regional Managers responsible for the local contacts with agents: Region 1; Austria, Benelux, France, Switzerland, and the East European countries, Region 2: Italy, Africa, and Middle East Region, Region 3: The Far East Region, Region 4: Portugal, Spain and the Latin American countries. The regional responsibilities and support structure will change, as the formation of new, independent sales subsidiaries takes off. The transitional character of the new marketing support organization is stressed:⁵⁴

The new organization introduced at the turn of the year is thus the first step in a long-term adaptation towards a future real product group organization. We are sure that, through this new organization and a gradual adaptation to a product group organization, we shall have greater opportunities of further continuing with the rapid expansion which began during the 1960s.

Pharmacia Fine Chemicals is not directly affected by the reorganization. The still small central support organization in Uppsala has a number of different responsibilities; educating and training representatives from subsidiaries and agents, performing R&D and application experiments, supporting the sales representatives locally, for example. The

⁵²Ibid p.2

⁵³Ibid, p.2

⁵⁴Ibid, p.4

contacts between the subsidiary management groups and Uppsala is mainly handled by the new support function under the head of Sven Boode.

1974-1982: SUBSIDIARY COMPANY FORMATION AND TECHNOLOGICAL UNIFICATION AROUND THE NEW BIOTECHNOLOGY

Three different subsidiary companies

During 1974, Pharmacia and the Fortia Group are reorganized. A merger between AB Fortia and the previous Pharmacia AB formally takes place as of January 1, 1974. The company is renamed AB Fortia and the headquarters are located to Pharmacia in Uppsala. Apart from the Sweden based, independent consumer product companies and pharmaceutical agencies - Meda AB, Famaco AB and Consiva AB - the Group is now organized in three divisional companies: Pharmacia AB (pharmaceuticals and chemical/technical products), Pharmacia Diagnostics AB and Pharmacia Fine Chemicals AB. The pharmaceutical and chemical-technical sales amount to 188 MSEK, while the separation product sales reach 40 MSEK and diagnostics 27 MSEK. As to sales increase, by far the most rapid growth is shown by the new diagnostics company which in only a few years is reaching the sales levels of Pharmacia Fine Chemicals AB. The real breakthrough for the diagnostics operations comes in 1974-75, almost nine years after the research group is established in 1966. The break-even point for diagnostics comes in 1976-77, and the established dextran products are complemented with a new range of export driving products. Along with the pharmaceutical sales groups in the HQ offices and in the subsidiaries, Pharmacia Fine Chemicals' sales organization is joined by completely new, specialized sales units for the diagnostic products. In Sweden and in the US subsidiary, special service laboratories for health care institutions with limited laboratory resources for diagnostical testing are also established. Thus, both the central and the local subsidiary organizations continue to expand due to the expanding sales of all the three divisions.

The end of the 1970s: the new biotechnology emerging as the integrating factor

While the new divisional organization as of January 1, 1975 reaffirms the idea of three separate business operations, the second half of the 70s sees the emergence of a new integrating factor for the Pharmacia Group: "the new biotechnology". In 1979, it is stated for the first time in an annual review that:⁵⁵

⁵⁵Annual Report 1979, p.33

The common background for the operations of the Pharmacia Companies is research and development in the field of biotechnology. A number of studies in Sweden and other countries in recent years have pointed to biotechnology as "a field of the future".

The pharmaceutical industry has utilized biotechnological processes for a long time; for example, penicillin and insulin have been produced from biotechnological processes. Pharmacia's production of dextran from sugar with the help of a strain of bacteria (so-called *Leuconostoc mesenteroids*) in the 40s is another early example of application of biotechnological processes. Thus, Pharmacia's position in biotechnology is not new in the mid 70s, when the opportunities of the breakthroughs in the so-called hybrid DNA research are beginning to be acknowledged. The company's position in the "new biotechnology" - connected to research breakthroughs in hybrid DNA technology - is to a large extent associated with Pharmacia Fine Chemicals' customer contacts with academic and private research companies involved in this research:⁵⁶

The Pharmacia companies are following developments in this field with great interest but are currently not conducting any research of their own in this area. Research and production processes within this technology require materials and methods used in biochemical separation technology, however, and Pharmacia Fine Chemicals is becoming involved in this sector.

However, the use of biological and biochemical materials and connected production methods is not only confined to Pharmacia Fine Chemicals. Allergon AB of the Pharmaceutical Division supplies raw materials for the production of allergy tests, e.g. by Pharmacia Diagnostics:⁵⁷

Allergon AB, Pharmacia AB and Pharmacia Diagnostics AB give Fortia a highly prominent position in the allergy field. Together with Pharmacia Fine Chemicals AB and BioCell Laboratories HB (a new R&D venture), they represent a strong constellation within the expanding area of biotechnology.

For Pharmacia Fine Chemicals, specifically, the potential of the general breakthroughs in the biotechnology field is pointed to:⁵⁸

The traditional customers have been institutional researchers, mainly biochemists. Approximately 80 percent of the Division's sales are to such institutional users. But the biotechnological industry is a new field that is becoming increasingly important.

To meet this increasing interest in biotechnology, Pharmacia Fine Chemicals openly acknowledges that it has also to complement its traditional product range for biochemical research:⁵⁹

....the demand for traditional separation technologies for proteins and similar substances increased at a slower rate than during the Sixties. This was due to the fact that biochemical research today is

⁵⁶Ibid, p.34

⁵⁷Ibid, p.34

⁵⁸Ibid, p.34

⁵⁹Ibid, p.44

directed in part to problems other than the study of proteins. Simultaneously, research efforts in the field of immunology, cell biology, clinical chemistry and gene technology have been strengthened rapidly. The needs in these fields are large and require supplements to the Division's present product range. The Division has accordingly begun a change-over to adapt to the trend in traditional biochemical separation technology which is developing more slowly than formerly.

The company's long tradition in supplying up-scaled separation installations is also expected to give the company an advantage as industries, especially the pharmaceutical industry, begin to apply biotechnological processes:⁶⁰

During the Seventies industries began to utilize biotechnological procedures with increasing frequency. The Division has exceptional prospects in this area since it is the only commercial firm that is marketing industrial installations.

Despite the increased organizational growth and operational uncoupling of the three main Divisions, Pharmacia now openly begins to stress the technological origins and bonds between them, with the new biotechnology as the integrating factor. Thus, Pharmacia Fine Chemicals' connections to and technological interdependencies with the other divisions is stressed:⁶¹

The Pharmacia Divisions are focusing their activities on the field of biotechnology, and their future is based largely on the progress that will be made in this field. Biotechnology is a new common base for the operations of the Pharmacia Divisions. Developments in this field have been especially rapid, and expectations are very great.... The future of the Pharmacia Divisions is largely based on the progress that has been made and will be made within biotechnology. In this context the divisions are dependent upon each other, and together they form a unit with a common base of knowledge. Because each of the divisions maintains a high level of knowledge in its respective field, and because there is a great deal of exchange among the different units, the Pharmacia Divisions have unique opportunities to develop - and partake of - biotechnology.

With biotechnology as the integrating factor, the company begins to openly adhere to the idea of developing "multi purpose competencies" which can be used for many different projects, by different divisions and for different customers. It is stated that "Fortia is no longer a traditional pharmaceutical industry. Instead, we are active in the rapidly expanding biotechnology, something which gives us the basis for numerous "cross fertilizations" between the different business areas. We will therefore give priority to business ideas and projects, where a broad spectra of applications is possible".(Figure 5.3)⁶²

⁶⁰Ibid, p.44

⁶¹Annual Report 1981, p.6-7

⁶²Annual Report 1982, p.7

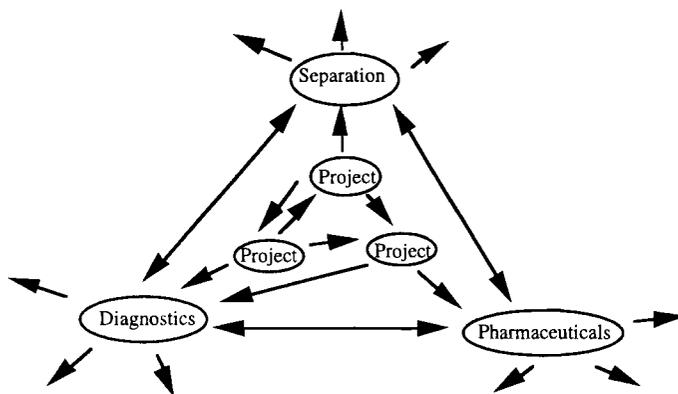


Figure 5.3. The "cross-fertilization" strategy. Projects linking the diagnostics, the separation products and the pharmaceutical operations. (Source: Swedish Annual Report 1982)

One of the effects of this new focus on biotechnology as common denominator is an increased attention to joint strategic planning. From the mid-70s, concentration on management development increases as does the importance of the common, strategic management group:⁶³

Effective decentralization requires support of the Group's long-term aims and other aspects of Groupwide strategy. For a number of years we have had a Strategic Planning Group (SPG), which discusses questions affecting the Group as a whole. SPG has also become one of the instruments for carrying out our "cross-fertilization strategy", to take advantage of the synergistic effects inherent in the divisions' operations. This is one of the Group's most important "company-specific" competitive advantages.

The separation products unit is being considered perhaps the most important link to the new biotechnology, as it has researchers and research institutions in the field of biotechnology as its customers and thereby has unique opportunities to monitor and apply the latest findings within basic research in this field. In the early 80s, Pharmacia states that:⁶⁴

The Pharmacia Divisions are currently not pursuing any research of their own on Hybrid-DNA technology, but the Group has ample opportunities to follow developments in this technology because companies that utilize hybrid-DNA technology use Pharmacia's separation products. They do so because this technology presupposes the kind of advanced purification methods which are the speciality of the Separation Products Division.

The two most important links to cell fusion research - beside Hybrid-DNA ("genetic engineering") research, the most important area in the new biotechnology - are those which are provided by Pharmacia's new collaboration with the La Jolla Cancer Research Foundation in California and the Institution for Cell Research at Uppsala University. The new BioCell Laboratories which are opened at Pharmacia in 1979 is another step into this

⁶³ Annual Report 1981, p.2

⁶⁴ Annual Report 1981, p. 7

area, a venture which aim is to provide both the Diagnostics Division and the Separation Products Division with raw materials for the area of cell biology. This opens up the way for another technological link between the separation product operations and another of the two main divisions of Pharmacia.

Although the new biotechnology is a new important pivotal factor for change in Pharmacia Fine Chemicals' business orientation, it is still difficult at the end of the 70s to evaluate the implications of the rapidly growing interest in this area worldwide. As stated in the company's long range strategic plans of April 1978:⁶⁵

How will new emerging techniques, like DNA-hybridization, affect us? It is too early really to say what will happen. Our products and methods can, of course, be used to separate molecules whether they are coded from hybrid DNA or natural DNA. In summary, the largest risk is that our development program fails or that we miscalculate the market for our new products/areas.

Technological changes within Pharmacia Fine Chemicals 1972-1982: the take-off of instrumentation and system integration

The opening of the Umeå factory in 1967-68 marks an important technological change in the production history of Pharmacia. The manufacturing of glass columns has been the first step towards instrumentation, a process which continues as a new gradient mixer for the biochemical substances and a new pump are launched in 1972 and 1973. The Umeå organization's contacts with research at Umeå University and the R&D department for separation products at Pharmacia in Uppsala are important foundations for this development. A new R&D manager for the division also joins the company in 1972.

During the period 1977-78, as a result of intense product development, a number of additional hardware products are added, which take the company's product range another step towards completion of integrated product systems: UV monitors, line writers, and fraction collectors.(Figure 5.4.)

Based on Pharmacia Fine Chemicals' established position in gel filtration, ion exchange and affinity chromatography, and the new interest in gels and chemicals for another established separation technique - electrophoresis - the company in its long-term R&D plans for 1975-1980 decides "to move towards complete systems encompassing apparatus and chemicals"(Long Range Strategic Plans 1975-1980). Customers' demands for faster and more efficient and precise separation are accentuated.

⁶⁵Long Range Plan, April 20 1978, p.8

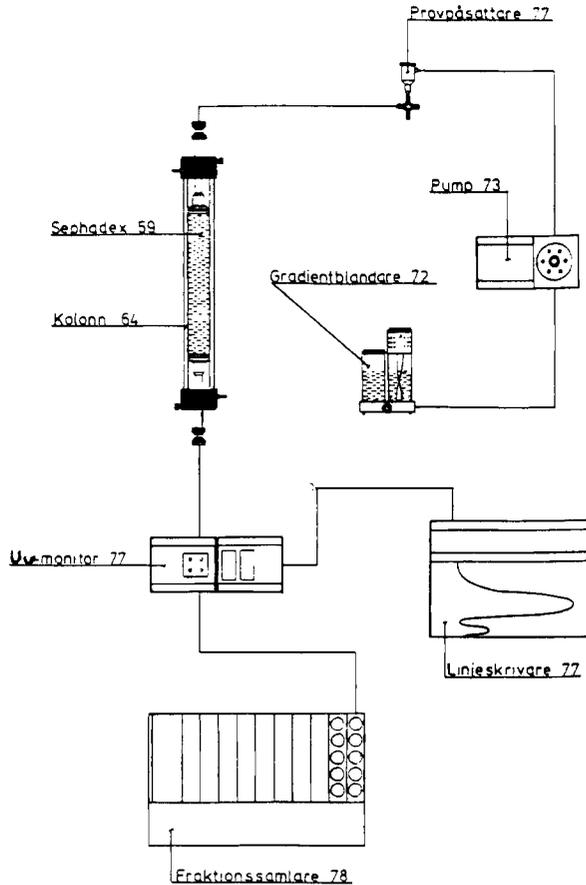


Figure 5.4. Extending the number of product system components (Sephadex 1959, column-64, gradient mixer-72, pump-73, sample inlet-77, uv-monitor-77, line writer-77, fraction collector-78)

The product system orientation of Pharmacia Fine Chemicals becomes connected to a production strategy characterized by a high degree of internal resource control. The long-term investment plans for the late 70s include investments in a whole new range of tools and machines for the Umeå factory, following the transition from mechanical to electromechanical towards more electronic components in the chromatography and later also in the electrophoresis instruments. The general strategy is to also control the production of these new types of components internally, using mainly the suppliers to provide the company with the basic raw materials for the instrument production in Umeå. The introduction of electronics is one of the prerequisites for the construction of integrated instruments and systems, a process which takes off during the second half of the 70s and early 80s. From 1977 and onwards, a range of sophisticated, integrated systems are launched, built on the breakthroughs in computer technology. Specially adapted, new chemical media (e.g. Sephasorb) are also developed and integrated in these new systems.(Figure 5.5.)

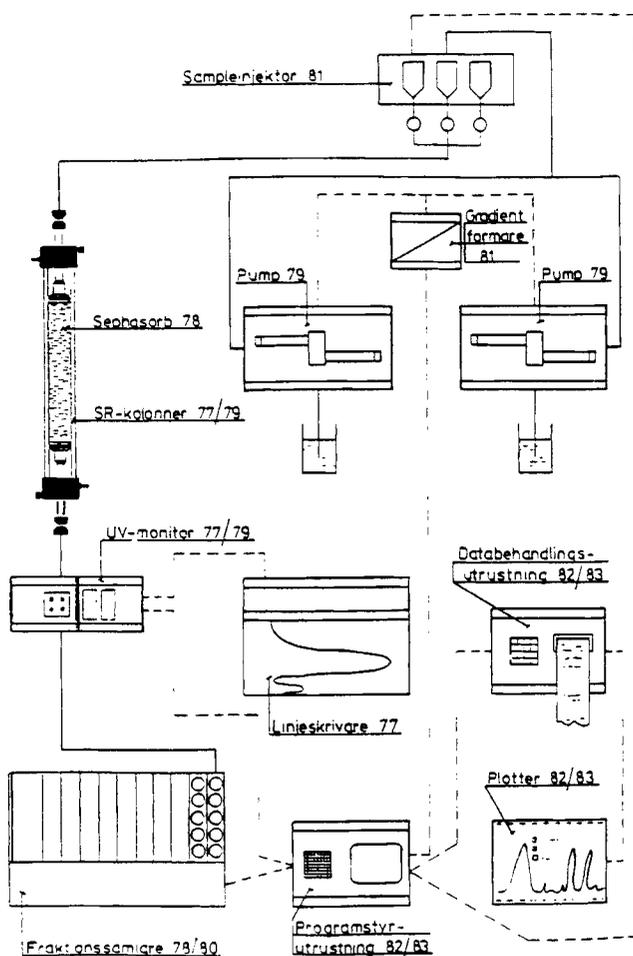


Figure 5.5. Integrating product systems (SR columns 1977/79, uv-monotor 77/79, line writer 77, Sephasorb 78, fraction collector 78/80, pump 79, sample injector 81, gradient former 81, computer equipment 82/83, plotter 82/83, software programs 82/83).

In 1974, a new department for instrument and apparatus development is established in Uppsala. The small group of newly recruited researchers and technicians in the areas of electronics, mechanics and biochemistry is placed in Uppsala and the group is consolidated during 1975. The group of 13 instrument researchers is expected to increase five times during the next five years, according to the long range plans of 1975.

The new system orientation comes to take a certain path. Influenced by the requests from single researchers/customers/colleagues - the roles of different counterparts are still multifaceted - in the Pharmacia organization and in organizations in Sweden and abroad, the chemical R&D group acknowledges the need for more rapid and efficient separation.

One of the crucial bottlenecks in many types of research situations, for example, among the company's academic research customers, is related to the need for faster separation.

To meet these demands, Pharmacia Fine Chemicals begins the development of new, "faster" gels in the area of chromatographic separation. In accordance with the long range plans, the expansion of the apparatus area is the result of these new requirements:⁶⁶

The product programme in the chromatography area will be broadened through the development of apparatus which fulfil these new requirements. The goal is to co-develop sample injectors, columns, pumps, valves and fraction collectors, and combined with measurement instruments (UV monitors, DI monitors) create flexible systems for chromatographic separation. The frame specifications are adapted to the new media that the chemical research is developing, so that the combination of apparatus and chemicals enables shortened separation times and increased dissolution.

The general changes among the company's research and medical care customers - the increased attention to preparative analyses and decentralization of routine analyses - draw attention to the need for small and medium sized instruments for analytical purposes and with automatic evaluation and measurement of separation results.

In the five year plans for R&D, production and sales 1975-80, the accumulated sales for chemicals is expected to reach 107 MSEK while the accumulated instrument sales will reach 50 MSEK, according to plans.

Key projects according to plans are 1) a new integrated chromatography system for fast separation (IPLC), 2) the development of a UV-monitor for measurement and control of the separation, 3) new electrophoresis apparatus, and 4) new fraction collectors for efficient collection of separated compounds. The accumulated investment needs (premises, machines, tools) for instrument R&D and production only is estimated at 5 MSEK for the period.

Long range marketing strategy 1978 - stability and change

In a presentation to the Fortia board in March 1978, Pharmacia Fine Chemicals' representatives confirm the company's already established strategy. The company now is and should continue to be "a highly specialized company in a relatively narrow segment defined as separation technology and related techniques within chemical and biological research". The company is known for its innovations, its high product and application service quality, its high level of knowledge in the area, and its high prices. The domination in certain separation techniques continue. This basic strategy is set, but it is

⁶⁶AB Fortia board meeting, 10 March 1975, transl.

also decided that with this strategy as the basis, Pharmacia Fine Chemicals needs to reduce its high dependence on certain types of end users.⁶⁷

At present, our target groups are mostly concentrated to the types of research areas which are dependent on public funding. This means that political decision makers affect our income by the grants they make our customers. Changes in the control and policies for public funding to research thereby affect us considerably. For this reason, we shall more actively approach target groups in the business sector. A product which is profitable for the customer, can always be purchased within this sector, without the purchase being hindered by the size of a research grant. Thus, a spread of risk between the public and the private sectors is desirable. Target groups and new needs within the private business sector will therefore be analysed.

Pharmacia Fine Chemicals has been living with this situation for almost 20 years so it is not new. In 1978, around 80 percent of total sales is expected to be generated in the contacts with and sales to individual and groups of researchers in the academic sector. Clinical laboratories in the health care sector, industrial, production departments in the food and pharmaceutical industry, and laboratories in the latter industry belong to the group of existing private, as opposed to public, customers. The relatively small part of the income coming from industrial, production scale customers - shifting from between 5 to 10 percent of total sales - is considered an area for change. Already from the start, when a researcher is set to investigate the possibilities to up-scale the gel filtration technique, the industrial customer group has been described as "promising" and with "a large potential". However, partly due to unexpected, environmental changes which have been difficult to adapt to, the number of industrial customers - purchasing mainly bulk supplies of Sephadex - are still only a handful worldwide. The oil crises in the beginning of the 1970s have made pharmaceutical and food companies more reluctant to invest in new separation techniques. Despite the efficiency of gel filtration, the crises put a stop to investments in new technologies where the energy consumption is relatively unknown. In the case of gel filtration, the technique requires the use of distilled water, the production of which is known to be energy consuming. Despite this setback, the end of the 70s sees the emergence of the new biotechnology, and a renewed interest in Pharmacia Fine Chemicals for approaching industrial customers, now focusing on companies in the pharmaceutical industry. An increasing interest among the world's pharmaceutical industries in large-scale biotechnological - as opposed to chemical - production of new types of biochemically based pharmaceuticals and diagnostics mean also that the companies will need efficient separation procedures.

In the strategic marketing planning of 1978, an existing fact concerning the contacts between Pharmacia Fine Chemicals and the customers is centrally acknowledged. That is, there is a high dependence on decision makers concerning research funding of both public

⁶⁷AB Fortia board meeting, 13 March 1978, p.2, transl.

and private organizations, but by tradition, the company has not developed any local or centrally organized contacts with these individuals and groups. From the start, the separation product group has built up strong connections with the actual product users, the researchers, and these shall continue to be the company's "most important target group".

The long-term strategy for Pharmacia Fine Chemicals is established at a board meeting in 1978, and it is based on four central ideas:

- to develop and market reliable products and connected methodological knowledge of a high technical standard within the areas of chemistry and biology
- to strive towards providing customers with total problem solutions
- to establish contacts with new types of customers, especially those which are not dependent on public funding
- to choose R&D projects so that optimal synergy between chemicals and instruments is achieved

In the long range plans for the end of the 70s and beginning of the 80s, the diversification into new product areas, new applications and new customer groups is summarized:⁶⁸

In summary, we will have programs turning to new target groups, the most important being people who want to use electrophoresis and chromatography in clinical or routine applications, those who are engaged in cell biology and immunology and people who consider chromatography as a production method.

The majority of existing customers are still depending on governmental funds and are still reported to be in a financial squeeze, and the overall goal that is formulated for Pharmacia Fine Chemicals emphasizes again the necessity of striving towards other money resources. But, this does not mean that these laboratory customers will be left. On the contrary:⁶⁹

At the same time we will not only maintain our position within our present customer group but improve it with new and better chemicals and instrument/equipment.

Changing application areas and customer needs

In the R&D plans for the period 1978-81 it is estimated that of the total share of R&D resources spent, approximately 72 percent will be related to new products for existing customers and target groups, while 18 percent will be devoted to new products intended for new customers and new target groups. Only 10 percent of total R&D resources is to be connected to modifications of, and research on, existing products, for both new and existing customers.

⁶⁸Long Range Plan 1979-1981, p.6

⁶⁹Ibid, p.6

Two broad groups of customers continue to be the targets for these R&D activities: researchers in the academy focused on the so-called "life sciences", and secondly, researchers and production managers in industry, also active in the "life sciences". A new interesting customer group that is to be investigated, according to the R&D plans, is made up of routine users of analytical equipment in the area of clinical chemistry.

In the 1979 R&D plans for the coming five years, no extended customer analyses are made. In contrast to the situation in the beginning of the 60s the central HQ organization in Uppsala is successively delegating all customer contacts to the subsidiaries. Central, comprehensive identification, registration and continuous analysis of the existing customers is not part of the headquarters routines. The rapidly increasing number of customer contacts are localized to the subsidiaries. The domination of academic researchers and contacts between individuals in Pharmacia Fine Chemicals' subsidiary organization and the local academic institutions in combination with the rapid growth in numbers of contacts is making it increasingly difficult to take in the whole situation. Although the subsidiaries' customer accounting systems contain the names of institutions and companies, in reality, the decisions concerning apparatus needs and the actual use is still limited to a few important individual researchers in these organizations. The few contacts with production departments in pharmaceutical and food companies are different, but despite the long-term engagement in up-scaling separation techniques, the area continues to be denoted an area with "an important future potential". The industrial customers are also changing as regards application areas, and analyses indicate that the potential industrial customers in 1978 cover a broad spectra of applications. They are private and government financed industries and manufacturing facilities producing:

- pharmaceuticals of biological origin, e.g plasma proteins, insulins, therapeutic enzymes, vaccines, etc.
- natural product and synthetic pharmaceuticals, e.g hormones, peptides, etc.
- biochemical products for research and diagnostic use, e.g research enzymes, pure proteins, etc.
- foodstuffs requiring specially prepared additives, e.g preservative enzymes, colouring substances, etc.
- materials through processes giving undesirable waste products which can be regenerated or cleaned up by methods, media and equipment sold by Pharmacia Fine Chemicals.

By far most important customers are the pharmaceutical companies and manufacturing plants active in the first of these areas. So-called plasma protein fractionation is considered one of the most promising areas for the company. The purification of insulins on a large scale is one of the areas where Pharmacia Fine Chemicals' up-scaled chromatography systems are also coming to have an important function. The slow development in the industry scale sales seems to be changing. It is stated in the plans for 1978-1980 that the objectives are now:⁷⁰

⁷⁰*Long Range Plans 1978-1980*, p.26

To introduce pilot plant installations world wide. Contact has already been made with plasma fractioners world wide. The HSA process(a new pilot plant system, comm.) will be launched July 1978 at the International Societies for Blood Transfusion Meeting. Pilot plants should generate processing data, experience and clinical back-up data leading to production unit installation at the end of the three year period.

Pharmacia Fine Chemicals' position in the forefront of separation technologies in the macro molecular area has since the launching of Sephadex been based on the R&D personnel's extensive personal contact network. Important individual researchers and research groups abroad and in Sweden continue to be "customers", "colleagues", "R&D partners" and so on, all at once, having multiple roles in Pharmacia Fine Chemicals' process of maintaining an indisputable lead in its area of separation technology. Building on these contacts, the company, which in Uppsala is heavily dominated by the R&D operations, in its long range planning in the late 70s begins to divide its existing and potential customers (which at an individual and global level are estimated to be over 100,000) according to application areas. In August 1979, the management and R&D group of Pharmacia Fine Chemicals presents the following estimation and goals for the forthcoming five year period:⁷¹

<u>Application Area</u>	<u>Market share(%)</u>	
	<u>Chemicals</u>	<u>Instruments</u>
Preparative separation of large biomolecules	70	40
Analytical separation of large biomolecules	25-50	25-50
Separation of biomolecules on industry scale	20	20
Preparative separation of small biomolecules	50	40
Classification of biomolecules	5-25	5-25
Classification of cells and cell parts	5-25	0-5
Preparative separation of cells and cell parts	10-25	0-5
Micro carriers for cell cultivation	25-50	0

The figures are considered to be goals for further discussions in the organization and are put in relation to the company's traditional competence and sales in different technological areas; liquid chromatography (73 percent of total sales in 1979), electrophoresis(12), sedimentation/centrifugation(8), biospecific methods(4) and micro carriers for cell cultivation(3).

For the majority of customers now applying some form of liquid chromatography - irrespective of purpose (analytical, preparative or industrial separation), technique (gel filtration/molecule size, ion exchange/electrical charges, affinity/biological specificity, adsorption/molecule structure) or separation contents (cells, cell parts, proteins, peptides, amino acids, organic molecules, organic polymers, inorganic compounds) - information from the subsidiaries indicate the same general changes. Customers' demands coincide concerning a number of performance related factors. Separation of biochemical compounds remains an important bottleneck in both research and production, but

⁷¹Long Range Plans, August 31, 1979

attention is directed at speed, efficiency, output, and also to some extent, at price. In the product planning, customers' reorientation is acknowledged as are the needs for adaptation to meet new demands:⁷²

...reorientation towards integrated systems with higher performance as regards separation times, degree of resolution and ease of operation with integrated application knowledge....The demand for traditional chromatography systems remain but the price/performance relationship is increasingly important...

Adapting headquarters - subsidiary - customer contacts and organizations to changing technologies and applications

A review of the marketing organization in 1976 shows that in the central marketing support organization can be counted in total twenty seven people (complementing eighty six in the Umeå production, sixteen in the Instrument R&D in Uppsala, forty six in media R&D and ninety nine in media production, plus management and administrative personnel). In the largest market subsidiary in USA, twenty three people are working with marketing support (complementing eleven in R&D). In eight other subsidiaries and among agents in sixteen countries, there are additional marketing personnel supporting the sales of separation products.

The take-off of instrumentation and product system orientation during the 70s affects Pharmacia Fine Chemicals' internal organization as well as the contacts and exchanges between headquarters, the subsidiaries and customers. The application support service provided to customers in the 60s has resulted in new organizational units in the subsidiary organizations. These units continue to grow both locally and in Uppsala as the integration of chemicals and instruments continues. The application support units give support to laboratory customers concerning all kinds of separation problems. Together with the sales representatives, the application support personnel is responsible for the important task of analyzing the separation problems together with the laboratory customers, and to help implement and start up the use of the separation systems. In some cases, the application services are performed on site, in the laboratories of the users. In other cases, application support is performed by the application service personnel within the small laboratories and showrooms of the growing subsidiary organizations. With the increasing complexity of the products and systems and with more intricate and varied separation problems to solve, the subsidiary organizations' teams of application and sales personnel grow towards the end of the 70s. Likewise, in the Uppsala organization, a central application research and support team emerges to support the local sales and application support units.

⁷²Long Range Planning meeting, 3 September 1979

The end of the 70s sees a change in the contacts between Pharmacia Fine Chemicals' central support units in Uppsala and the local subsidiary organizations. Contacts are generally becoming more intense, an effect of long term planning for R&D, product development and production becoming more difficult. As stated in the plans presented in 1979, when a change from five to three year planning is decided on:⁷³

We have found that five years is too long a period for us. Our business in general cannot be quantified more than three years ahead...

The difficulties to plan ahead for more than three years is coupled to a need for better information about present and future applications. As a result, long range planning towards the end of the 70s for the first time is done in collaboration between Uppsala and local subsidiary management groups:⁷⁴

...subsidiary management has been involved in the preparation process to a larger extent this year and consequently has had better opportunities to influence the final consolidated plan.

With the take-off of instrumentation emerges another investment need. With the introduction of integrated electro-mechanical and electronic components comes also the need to invest in new technical support personnel to take care of repairs and technical service support, in case of instrument break-downs, for example. In general, the few service support technicians employed are often integrated in the larger application support units. Most of their technical service activities are performed in the small workshops of the subsidiary organizations. In case of product failure the instruments are brought back to the subsidiary organization for repair. The sensitivity of many of the laboratory customers to such breakdowns necessitates a quick replacement, which means that warranties come to include guarantees that a new instrument will replace the old one in case of breakdown. The small technical service units - often delimited to one or a few service technicians - come to operate as cost centers in close connection with the application service units. In Uppsala there emerges also a minor technical support unit, basically devoted to develop instrument manuals and technical specifications.

For the subsidiary-customer contacts, in general, the period sees a shift from the teaching and implementation of gel filtration, to more intense and varied contacts adapted to each customer's specific separation problem. Despite the fact that technical problems sometimes appear during the course of using the company's systems, contacts remain most intense during the start-up and implementation phase. In case of breakdowns, instruments are often scrapped and replaced by the customer. Pharmacia Fine Chemicals' now established reputation in separation technology among laboratory scientists often

⁷³*Long Range Planning, 1979-1981*, p.1

⁷⁴*Ibid*, p.1

gives the company an advantage, in light of the fact that these customers are generally known for their tendency to "shop around".

Towards the end of the 70s, the difference between handling industrial and laboratory scale customers is being stressed internally. As to the former, instructions from Uppsala in the long range planning state that the handling of industrial customers shall be organized in close cooperation between the subsidiary and headquarters:⁷⁵

Industrial installations and larger industrial business and bulk sales of disposable (prepacked) columns must be coordinated by HQ.

Pharmacia Fine Chemicals' industry group's new focus on pharmaceutical companies and manufacturing plants for blood plasma fractionation in 1977-78, directs the industrial HQ group's attention to a number of specific areas and subsidiaries where pilot plants are planned to be installed or are in the process of being planned :⁷⁶

Strong support will be given to the Dublin, Helsinki and Japanese groups in order to generate data required for the marketing process to large fractionation facilities. Development of a total fractionation scheme in Uppsala will lead to a more attractive process. Compatibility with the existing method will be given priority.

The renewed attention to the industrial customers is coupled with an awareness centrally, that the observed changes need to be coupled to adaptations of the marketing strategy. HQ analyses of changes in the process customer operations indicate a change from small scale and a fairly unknown application business to large scale/known application with direct involvement from Pharmacia Fine Chemicals, centrally and locally. With these observations of general changes in the contacts with the still limited number of industrial customers, it is stated centrally that this calls for reorganization and more intense coordination between the central Industrial Product Group, the customers, the subsidiaries and the HQ Export Department with the overall responsibility for the contacts with the foreign subsidiaries. Firstly, three general, major features of HQ-industrial customer relationships need to be acknowledged internally:⁷⁷

1. The customer performs applications work with Product Group acting as project leader/consultant, the customer is led to process utilizing Pharmacia Fine Chemicals' hardware and media.
2. We do own applications research and development in e.g. plasma fractionation, this aims at the industry customer adopting Pharmacia Fine Chemicals' methods, media and equipment.
3. We do own studies on customer specific applications (considered of general importance to us) together with the customer.

⁷⁵*Long Range Plan 1979-1981*, p.17

⁷⁶*Marketing strategy 1978-1979*, p.27

⁷⁷*Ibid*

All three features, or marketing strategies, are assumed to require a closer contact between HQ and the industry customer.⁷⁸

It is recognized that the lead time from initial customer contact to purchase order is longer than for laboratory product lines. Close contact between the Product Group and the customer along one, or a combination, of the three strategies above is aimed at keeping lead time at a minimum. Subsidiary/Export Group contact with customer and Product Group is considered extremely important in this process.

The Subsidiaries and the Export Department need to be more involved with industrial sales in major and key areas, according to situation analyses. Firstly, they both have an increasingly important function of recognizing potential applications and feeding back to the Product Group. Secondly, they are now also to organize and maintain customer contacts, developing opportunities for the Product Group to develop customer interest into purchase. The sales outlets have a key position in the initial stages, putting the industrial customer on a critical path of purchase. Lastly, the Subsidiaries and the Export Department are also to take a greater responsibility for contributing to market analyses of potential growth areas of the industrial Product Group, contributing directly to the direction of technological development.

The changes in roles and functions of the Subsidiary organizations and the Export Department in relation to the industrial customers are coupled with changes in the roles and functions of the central Product Group. Four important change areas are acknowledged: Firstly, increased information exchange with the other internal units is necessary. The importance of defining and subsequently informing the sales outlets of potential applications is increasing. Secondly, the information backup also concerns existing large-scale separation technology. The subsidiaries need to be provided with more thorough background knowledge of industrial separation methods and products. Thirdly, the Product Group also needs to intensify the general spread of information about large-scale separation, by publishing results of in-house R&D work in appropriate journals, for example. Lastly, the need to increase and coordinate the direct contacts with the industrial customers is acknowledged.⁷⁹

(the Product Group will)...Accompany subsidiary export personnel on well-selected customer visits as well as organize seminars and participate in major congresses and local meetings considered to be of importance for promotional reasons.

The internal contact patterns connected to sales and marketing to laboratory scale customers is not changing as openly as in the case of the industrial customers. However, some adaptations are suggested also in these contacts, according to HQ recommen-

⁷⁸Ibid, p.27

⁷⁹Ibid, p.27

dations. Against the background of increasing competition, and customers increasingly sensitive to features/price relationships of instruments, Pharmacia Fine Chemicals' marketing strength is acknowledged to be connected to the company's general high reputation and knowledge in chromatography; the company can provide complete systems and application knowledge. Consequently, the subsidiaries shall be given material and support to be able to transfer these systems to the benefit of the customers. It is stated in the internal marketing plans that:⁸⁰

It is essential that outlets have proper service functions when the (laboratory) instruments are introduced. Considerable investments in demonstration equipment are inevitable.

In addition to the fact that the new instrumentation focus leads to the growth of both the central and local service support organizations, the local inventories of instruments and systems also continue to grow - and not only due to the growth of local inventories of demonstration equipment. In general, the changes come to have more effects on the service organization as compared to the physical distribution operations. Columns, pumps, gradient mixers have successively been incorporated as components in the existing distribution routines. The sales of more integrated systems does not much change these routines. Inventories are still kept both locally, in the customer and subsidiary organizations, and centrally, in the central warehouses in Uppsala and in connection with the production in Umeå. Other organizational changes related to the marketing organization come to overshadow the internal adaptations and modifications of distribution routines.

Changing marketing organizations

Pharmacia Fine Chemicals' traditional organization structure for the Uppsala units remains, with functions for R&D, Marketing, Production and Economy. However, the central organization also sees the emergence of five product groups, forming a matrix organization with the functional units: Chromatography, Cell biology/Biochemicals, Laboratory Equipment, Electrophoresis and Industrial Equipment.

However, the rapid change in product programs and the focus on new customer groups and application areas, introduces uncertainty regarding the structure of the central HQ organization. For example, the general step up of the Electrophoresis Group's activities - partly aimed for the new group of clinical laboratory customers - causes the central management group to suggest in the long range planning that future organizational changes are to be expected.⁸¹

⁸⁰Ibid, p.27

⁸¹*Long Range Plan 1979-1981*, p.18

..it means a major step-up of our electrophoresis activities. Hopefully it will lead us into better contact with clinical routine labs. Together with clinical applications of SMA (the Chromatography Group) and particularly SMB (Cell Biology/Biochemicals Group) products that may give us a heavy program for the routine hospital lab - maybe justifying major changes of our marketing and sales organization.

The technological changes and the product diversification that are initiated in the period 1974-82 have significant effects on the organization in the coming years. The 1980s become the decade of continuous reorganizations, affecting above all the central Uppsala units. However, the period also sees the continuation of changes in the local subsidiary organizations. New foreign subsidiaries are established, and existing subsidiaries grow and are re-organized. The local connections between the separation product units and the two other units for diagnostics and pharmaceuticals is increasingly becoming more heterogeneous.

The many technological changes in the period overshadow many of the organizational changes in the highly dynamic, local subsidiary organizations. Some of the major organizational changes in order of appearance, give an indication of this dynamism:

1975:

In the USA, Pharmacia Laboratories Inc. which has been established in 1949 and the separation product company, Pharmacia Fine Chemicals Inc., are merged into a new corporation, Pharmacia Inc. Three divisions are formed for the three main business areas. In 1973, the American subsidiary enters an expansion phase, involving considerable investments in new administrative, production and research facilities at its location in Piscataway, New Jersey. In Japan, the small and newly established subsidiary, Pharmacia K.K.(1973), moves into new premises in Tokyo. In France, Pharmacia France S.A., is established the year before for the marketing of separation products and diagnostics, and is reorganized in 1975 when the subsidiary is complemented with a company for the marketing of pharmaceuticals, Pharmacia Laboratoires S.A.R.L.

1976:

Pharmacia(Canada) Ltd. invests in an extension of the marketing organization for diagnostics. New investments in small, local distribution depots for the geographically widespread market are planned. The separation product unit develops contacts with the American subsidiary Pharmacia Inc. in order to coordinate technical service and sales training. In Switzerland, a new subsidiary is established in Zurich. Initially, the company markets only diagnostics and separation products. In Belgium-Luxembourg, a new company, N.V. Pharmacia Belga S.A., is established together with the former agent Brocades-Belga S.A. The local sales office in Vienna is reorganized into a separate subsidiary for Austria and Eastern Europe, Pharmacia Gesellschaft m.b.H. Due to rapid expansion and growth, the German subsidiary moves from Frankfurt am Main into new premises in Freiburg, including administrative, laboratory and warehouse facilities. In Denmark, Pharmacia AS invests in new production and distribution premises in Hillerød, extending Pharmacia's pharmaceutical production capacity.

1977:

Most organizational changes in the market organizations are linked to growth and expansion. Pharmacia(South Seas) in Australia, and the subsidiaries in Norway and Finland all move into new and larger premises. The acquisition of the manufacturer of raw materials for diagnostics, BPC Inc. in USA, requires mainly adaptations of the US subsidiary's diagnostics division.

1978:

A new subsidiary named Pharmacia Brasil Servicos S.C. Ltda is established in Rio de Janeiro in order to be better able to develop a position in South America. Pharmacia (Japan) K.K. reorganizes in connection with a takeover of the marketing responsibility for Pharmacia Fine Chemical's separation products in Japan, and moves into new premises. Pharmacia UK expands the marketing units for all three business

areas in connection with a move into completely new premises near Heathrow. A new organizational structure is created, adapted to the total sales increase 1977 to 1978 of 70 percent.

1979:

An acquisition of a minor electro-medical company in Denmark requires organizational adaptations in the Danish subsidiary Pharmacia AS. In Sweden, a separate sales subsidiary for diagnostics and pharmaceuticals is formed under the name Pharmacia Sverige AB. At the end of the year and in the beginning of 1980, Pharmacia France moves into completely new facilities, much due to the rapid expansion of sales in the diagnostics area.

1980:

In France and in the USA, the diagnostics groups each acquire a new company in the diagnostics field.

1981:

The Pharmaceutical Division establishes its own sales organizations in Belgium, the Netherlands and Austria, where Pharmacia already has subsidiaries. It affects the separation product units, and is a consequence of the pharmaceutical units' policy of strengthening marketing resources in the main areas, primarily linked to the new ophthalmology product Healon. A reorganization of pharmaceutical sales is also performed in the Finnish market. Pharmacia takes over the complete control and ownership of the Belgian sales subsidiary.

The expansion of the central and the local organizations continue, while the speed of international expansion through the establishment of independent sales subsidiaries levels off.

...and changing internal, organizational complexities...

The name Pharmacia Fine Chemicals is successively being replaced by Separation Products Division during the late 70s and early 80s, one reason being the reduced domination of fine chemicals in the Division's product line. Despite the increased attention to the synergism, common background, and common links to the new biotechnology of Pharmacia's three major divisions, the organizational growth and separation also continues. The period 1974-82 sets the stage for the many internal complexities and reorganizations of the 1980s, resulting from the seemingly paradoxical need to both coordinate and separate the pharmaceutical, the diagnostics and the separation products divisions.

During the second half of the 70s, the separation product activities continues to develop its own business operations, but is still in the situation of having to share resources with the other two divisions. In the long range plans for the period 1979-1981 presented by Pharmacia Fine Chemicals' management group at a board meeting in 1978, it is decided that something has to be done about the chemical production in Uppsala:⁸²

The chemical production in Uppsala is at present only partly performed within the Division. During the period, an increasingly larger share of the total chemical production will be transferred to the control of the Division, in a central, main function for chemical production...As we reach a certain size, it is probable that we conduct all chemical production within the Division.

⁸²Long Range Plan 1979-1981, p.2-4. transl.

The dextran production is still controlled by the pharmaceutical division's unit for infusion products. However, with new investments in multi-purpose plants for the fine chemical production, the Separation Products Division is successively getting more control over its own chemical production operations. Still, in the early 80s, the technological links remain. One of the Pharmaceutical Division's most promising projects in the Infusion Product area - Spherex, for treatment of liver cancer - is based on technology from the Separation Products Division and is presented as another successful example of "cross-fertilization" between the three main Pharmacia divisions.

The growth of the central units for diagnostics in Uppsala, the Diagnostics Centers, leads to a further separation also from these units. Some of the Separation Products Division's apparatus and media are used as inputs in the Diagnostic Division's operations, but at central HQ level the organizational and operational links continue to weaken.

On the other hand, in the subsidiaries, the internal "distances" between the three Division's operations are shorter. Several of the newly established subsidiaries are founded on the sales of diagnostics and separation products. The connections to the pharmaceutical business activities come to vary between countries. From 1980, in the case where an open, local uncoupling of the separation product activities from those of the pharmaceutical units begins, it is mainly caused by the new marketing strategy and change initiatives of the Pharmaceutical Division. This strategy is officially described in 1981:⁸³

The Division has begun an extensive process of concentrating its distribution and marketing. It will focus its own international marketing organizations primarily at certain categories of specialists at hospitals, mostly important surgeons, gastroenterologists and ophthalmologists. The Division intends to create marketing resources for these physician categories that are strong enough to take advantage of the potential of its own products, and at the same time capable of attracting products from other major companies manufactured on licence. Different types of marketing cooperations will be considered for products aimed at other customer categories. This proposed concentration of operations has resulted in the central Division being subdivided into four business areas.

The Pharmaceutical Division's concentration and sub-divisionalization, and the launching of a new range of specialized products (e.g. Healon for eye surgery in 1980) together with the new focus on various cooperation agreements with other companies, become important driving forces for the start of organizational uncoupling in the local subsidiaries. In 1980, the Pharmaceutical Division and the Diagnostics Division establish a new, joint sales subsidiary in Sweden, Pharmacia Sverige AB. In 1981, the Pharmaceutical Division establishes its own sales organizations in Belgium, the Netherlands and Austria.

⁸³*Annual Report*1981, p.14

In those subsidiaries where the Separation Product Division remains connected to one or two of the other major divisions, the local subsidiary management groups become the most important integration factor. In some cases, the connections are also provided by the customers. For example, the increasing importance of clinical laboratory customers and clinics in general for all three divisions, in some cases comes to create such links; for the clinics the sales representatives represent "Pharmacia", not three different divisional companies. However, due to the different user situations, there is no open need for sales coordination. The sharing of internal resources, for administration and inventories, in the subsidiaries, also show a diversified picture in the beginning of the 80s. In all three divisions, however, the tradition of keeping inventories close to the customers within the local subsidiary organizations remains firmly accepted.

The internal structure of the Pharmacia Group is successively becoming more complex as all three major divisions grow towards the end of the 70s. For Pharmacia Fine Chemicals, the need for own investments has arisen due to the fact that the central organization has been able to thrive on the expansion of the two other divisions:⁸⁴

In the past, and in spite of a rapid growth, the Division has not had to invest heavily in buildings and equipment. This has in part been due to the relocation of the other Divisions to Fyrislund leaving expansion room for Fine Chemicals at the Boländerna site. This process will slow down in the future and necessitate increased investments in fixed assets. We will, thus, build a new office building 1980-81 and a new Multi Purpose Plant 1979.

The increasing organizational complexity thus also becomes coupled to the internal growth of the Separation Products Division. Apart from keeping up the contacts with a growing number of expanding and more complex subsidiaries, the Division now has production of new chemicals located to Uppsala and Piscataway, instruments and apparatus are manufactured in Umeå, and research and development is conducted in both Uppsala and Piscataway. The internal growth and coordinative complexity increases as the Separation Products Division, and its two major sister Divisions, all enter a phase of radical external expansion in the 80s, developing a new internal organizational structure built on a number of new acquisitions, mergers and alliances.

The start of external expansion

The years 1982, 1986, and 1989 will come to stand out as important breaks in the history of the Separation Products Division, or rather, of the Biotechnology Group, Pharmacia LKB Biotechnology, and Pharmacia Biosystems which are the three names given to the biotech related operations during different periods of the 1980s. The breaks are caused by different externally oriented changes, acquisitions and merger processes, which radically

⁸⁴ *Long Range Plan 1979-1981*, p.5

change the structure of the organization and its position. During the period leading up to the first change in 1982, a number of external events set the stage for the continuous organizational changes that will come to characterize the 1980s and the beginning of the 1990s.⁸⁵ However, the first signs of this take-off of the Pharmacia Group's external expansion are not induced by the Separation Products Division; it is above all the Diagnostics Division and the Pharmaceutical Division that lead the way.

Stable contacts with other companies and research institutions have always been a prerequisite for Pharmacia's expansion and technological development. The contacts with local institutions in Uppsala and the numerous contacts with American, public and private, institutions have been crucial for the company's development. In addition, all three major Divisions have extensive, often long-term and stable, contacts with other private companies linked to the pharmaceutical and health care sector.

The long-term cooperation with the Dutch company Organon, terminated in 1968, has been one important forerunner to the changes in external orientation in the diagnostics field in the 80s. As a matter of fact, the Diagnostics Division is partly a leader in the process of external expansion, starting towards the end of the 70s. The acquisitions of Swedish Allergon AB and US. based BHP Inc. (sold again in 1981) are important starting points.

In the pharmaceutical field, 1981 stands out as another important starting-point and take-off for rapid external expansion. New stock issues in Sweden and the US. during 1981, which together generate 76,4 million dollars, markedly improve Fortia's financial position. Complementing the Diagnostics Division's cooperation agreements during the year - with the American company Kallestad Laboratories Inc., with Norwegian company Nyegaard & Co A/S and with the French company C.E.A. - the Pharmaceutical Division concludes a number of cooperation agreements. An agreement is signed with the American company Johnson&Johnson, with Schering, with Kabi-Vitrum and with Gambro. In addition, the Division initiates discussions concerning the acquisition of know-how and rights to all products of the American company Nu Tech Medical Systems Inc.

The Separation Products Division is also in contact with a number of European companies for acquisitions between 1979 and 1981, for example with the Swedish company LKB-Produkter with whom, however, for various reasons no deal is concluded. The increasing competition, the new focus on product systems, and the need

⁸⁵See Appendix x for a more detailed list.

to acquire products and resources which can position the company more firmly in the rapidly expanding field of biotechnology are important underlying driving forces for this new orientation. In July 1979, BioCell Laboratories HB is founded in Uppsala. Pharmacia takes a step into the important and expanding area of cell biology by investing (50 percent ownership in 1979, 83 percent in 1982) in a new venture, focusing primarily on the fields of cellular research and immunology. The first in a series of products are immunological reagents and antiserums used in biochemical research and for diagnosis of diseases. BioCell's specialized research, product development and production operations are expected to be important to those of the other Divisions.

When the Separation Products Division in 1982 acquires the American company P-L Biochemicals Inc. it strengthens the company's position in the new biotechnology. The addition of fine chemicals for molecular biology research enables the Division to offer system solutions and a broader spectra of products for laboratories and researchers active in hybrid-DNA research.

The many externally oriented changes affecting the Pharmacia Group around 1982 are in some ways challenging to the dominating structures, control and power systems, and the culture of the Pharmacia Group. The particular challenges for the Separation Products Division, when faced with the task of integrating the operations of another company in 1982 will, however, be limited compared to the challenges facing the company in 1986 and 1989. As the Division - soon to develop into a multinational group of organizational units - enters the 80s, it also enters a period of high levels of change activity. Compared to the relatively stable processes of growth and change during the 23 years after the introduction of Sephadex and gel filtration, the company now confronts a number of quantum changes which will radically transform many of the traditional, stable elements of the old organization.....

EXTERNAL EXPANSION, MERGER AND CREATION OF A MULTINATIONAL CORPORATION 1982-1989

1982-1989: EXTERNAL EXPANSION AND SUB-DIVISIONALIZATION

In 1981, when Pharmacia and Fortia enters the 80s and a period of external expansion and growth, its Separation Product Division is generally considered a world leader when it comes to biochemical separation techniques. Among researchers and research institutions in the field of biotechnology where the Division has its most important customers, the advanced purification methods which have become the speciality of the Division are used world-wide by researchers. The liquid chromatography process for laboratory scale separation is by now established as one of the crucial techniques used in the expanding gene technology research. However, in the beginning of the 1980s competition increases noticeably in, for example, the HPLC product area (High Performance Liquid Chromatography) as chromatography instruments and media are introduced by a number of companies. The Division's products for separation on a production scale enters the spotlight but also here competition increases. Before 1981 the Division has virtually been the only company with an integrated range of products for large scale chromatographic separation. Now enter a number of new competitors, satisfying the large and growing need for efficient purification on an industrial scale in research and in pharmaceutical production.

For the Separation Product Division the period 1982-89 marks an important shift in the history of the emerging company. When the term "shift" is used it is used in a relative sense; many of the changes and problems characterizing the period are continuations of processes sometimes begun long before. This is the era of external expansion when Pharmacia as a whole and the separation product division in particular acquire and integrate a number of established companies into the expanding organization. Up until the late 70s and early 80s it is above all the growth through rapid sales increase which stamps its mark on the changing organization. In the 1980s, with 1982 and 1986 as exceptional years, the separation product organization expands and some changes in the organizational structure are of a kind and a magnitude not experienced before in the history of the emerging company. The period of organizational adversity in the biotech operations following the acquisition of the Swedish company LKB Produkter in 1986 results in and sets the stage for the radical changes in marketing and distribution operations after 1989. The subsequent changes in distribution routines, in after sales services, in the internal EDI systems, in the international net of subsidiaries, and so on,

are all in some way or another connected to the preceding merger process. This is also the period when the biotech group more explicitly begins to sub-divisionalize the operations; there begin to emerge three separate, but inter-dependent, units for laboratory products, for process scale products and for molecular biological fine chemicals.

Despite the still strong technological interdependence between the three main Pharmacia divisions for pharmaceuticals, diagnostics and separation products, the period puts into the spotlight the tensions between this technological interdependence and the organizational growth and increased operational interdependence of the three divisions. The organizational challenges facing the Separation Product Division surface clearly as the Division expands and concurrently becomes part of the expansion processes of the other divisions. The many externally oriented changes also affect the internal organization of vertical contacts between central organizational units, local subsidiary units and customers. The period of organizational adversity after 1986 includes a radical shift in vertical coordination and exchange; in the merger with LKB some of the former continuity is broken and there are indications that a number of former LKB-customer relationships are broken in the fusion process. Concurrently, the whole, global biotech industry enters a period of change affecting also the Biotechnology Group's (the name is established from the middle of the 80s) customer relationships. There are indications of a growing importance of applied research labs. and also a growing importance of the industrial applications customers, mainly pharmaceutical companies' production units. Overall, the 1980s become the era when the application and acceptance of the new biotechnology is definitely set. Pharmacia Biotech becomes one of the central suppliers of equipment in the new, global network of companies involved in biotechnology related research and applications.

As a result of the changes during the period, aspects of stable, long-term continuity in Pharmacia's and the Separation Product Division's operations, traditions and corporate culture surface. The stable "academic" background of Pharmacia and the biotech division, which has been established almost since the beginning of the company's existence, comes in conflict with apparently different, more "industrial" traditions long established in LKB. The fusion process automatically brings into focus the differences (and some apparent similarities) between the two companies concerning internal routines, the contacts with customers and other organizations, and more. Several decades of successive adaptations have brought with them two different foundations and logics for long-term continuity, which clash in the endeavours to merge the two organizations.

The period 1982-85 is the start of the Separation Product Division's externalization through major acquisitions. The American molecular biology specialist, P-L Biochemicals, is acquired and integrated in the Pharmacia Corporation. P-L Biochemicals later becomes one of three "companies" in the Pharmacia Biotech group in the early 90s. The period 1986-89 is the period of merger and internal, intra-corporate reorganizations and consolidation efforts. All the three major Pharmacia divisions are involved in acquisitions, and one of the most problematic of these acquisitions affects the Separation Product Division when it is merged with LKB Produkter.

THE BIOTECH GROUP 1982-86: SALES GROWTH, TECHNOLOGICAL CHANGES AND THE START OF THE EXTERNAL EXPANSION

During the period preceding the peak of external expansion in 1986, Pharmacia's biotechnology group, Pharmacia Fine Chemicals, is exposed to a number of new situations and new problems to solve. The period around 1982 marks an important shift in the development of the chromatographic systems, resulting in rapidly increasing sales and an urgent need to expand and reorganize production in the Umeå plant. Furthermore, the acquisition of the American company P-L Biochemicals marks another important shift; for the first time Pharmacia Fine Chemicals acquires and integrates in the Sweden based biotech operations another company in a related field of biotechnology. Thirdly, the Division's separation business on a production scale enters the spotlight again. Pharmacia Fine Chemicals has once been virtually the only company with an integrated range of products for large scale separation. Now enter a number of new competitors, and as biotechnology research is increasingly being transferred to the industry, industrial customers' demands for both laboratory equipment and systems for subsequent steps in the production process increase. This also highlights the need to adapt the coordination between central, process scale units, the subsidiaries and the industrial customers. Lastly, the 1982-86 period sees the advent of a number of important technical and technological changes. The orientation towards the new biotechnology is reflected in, for example, a number of successive name changes; the name "Pharmacia Fine Chemicals" which has been established in the 1970s is replaced in the early 80s by the more all-embracing name "Separation Products Division", which in turn is replaced by the general denotation "the Biotechnology Segment" in 1984. These continuous name changes are resumed after 1986, but then as a consequence of the many organizational changes affecting the organization.

Sales growth, delivery problems, and a need to expand and reorganize production

The Separation Products Division's rate of growth in the years 1981 and 1982 is the fastest since the record year of 1978. Sales total USD 38 Million in 1981, thereby exceeding the Division's forecast considerably. The slower rate of expansion within publicly financed research is compensated by a booming interest in gene technology, resulting in a number of new, privately controlled and financed R&D firms appearing on the scene together with established companies, in the pharmaceutical sector for example. Thus, despite reports of major cutbacks in research funds reaching the Separation Products Division in 1981-82, the total market for the Division's products shows remarkably good growth. In its niche of separation technology, the Division remains the leading global provider of supplies.

The established HPLC technique is after several years of R&D in Uppsala complemented with an equivalent technique called FPLC, Fast Protein Liquid Chromatography, especially adapted for working with biological substances. The successful launch in 1982 of the new, integrated chromatography system - which shortens the time for separation of biomolecules from hours to minutes - is officially described as "the foundation for the Division's future investments directed towards laboratory customers as well as the industrial producers".⁸⁶ The rather unexpected success of the new FPLC system accentuates the existing lack of production capacity for instruments.

Although the factory floorspace of the Umeå factory is doubled in the autumn of 1982, it only takes three years, until the end of 1985, and the floorspace in the factory is almost doubled again. The small instrument workshop that is opened in 1967 has by 1985 developed into a large, modern instrument factory based on electronics and precision engineering. The expansion in 1982 is necessary to meet the demand for the new computerized FPLC system. When the product is launched in the autumn, the demand exceeds expectations and the factory ends up with urgent delivery problems. In 1983, planning for further expansion begins. A decision is taken to invest 125 MSEK in new extended plants in both Umeå and in the Uppsala based chemical production. The Uppsala investments also include a new R&D laboratory for the Separation Product Division.

One of the solutions to the lack of capacity is to contract out some production to workshops, mainly in the local Umeå region. Despite the long tradition of keeping most production and assembly under the same roof in the Umeå plant and reducing subcontracting to a minimum, the responsible Works Manager needs to marshal all

⁸⁶Annual Report 1982, p.21

available extra (external) resources to cope with the unexpected demand for FPLC products. When the demand for the other products also begins to rise in 1984, it is hard to keep up the production and complaints from the customers via the subsidiaries reach the Uppsala organization. In May 1985, after two major extensions of the plant and internal reorganizations an improvement can be reported:⁸⁷

Capacity is improving, and the new facilities should put an end to the overcrowding problem. This will improve working conditions on the production line and eliminate the need for sub-contracting.

Thus, the use of sub-contractors has only been a temporary solution to cope with capacity problems. The biotech group and the Umeå factory do not intend to change the present supplier strategy.

Another problem which is accentuated during the first half of the 80s concerns the contacts between Uppsala and Umeå. All research and development on the apparatus manufactured in Umeå takes place in the established R&D department in Uppsala, 600km from the Umeå plant. The introduction of new technology promises to solve part of the growing concerns:⁸⁸

It (the distance) can be awkward when there are a lot of things happening, but new technology can overcome distances. The computer, video and teleconferencing are becoming more useful...

Other important changes in the reorganization of instrument production 1982-85 are linked to quality control, the introduction of new forms of internal product based work groups, new materials handling methods using "semis", i.e. incompletely assembled instruments and apparatus. All these measures and investments are aimed at increasing flexibility in the production. The biotech group's experiences show that market requirements can change quickly. By 1978, the long-term tradition of making five year long range plans for product R&D, production and the choice of technique and application areas is abandoned:⁸⁹

This long range plan is different to previous ones on two important points. The first is that it deals with three years instead of five and the second is that the plan has been thoroughly discussed with most of the subsidiaries before final consolidation. We have found that five years is too a long period for us. Our business in general cannot be quantified more than three years ahead. As opposed to other industries, eg. pharmaceutical industry, we have very few, if any, long and expensive projects which require planning of heavy investment in R&D or in production and marketing. If projects or commitments should require longer planning than three years and be of major influence on our business, we will of course extend the plan accordingly. The second important point is that subsidiary management has been involved in the preparation process to a larger extent this year and consequently has had better opportunities to influence the final consolidated plans.

⁸⁷*Pharmacia News*, No 7, May 16 1985, p.4

⁸⁸*Ibid*, Björn Persson, Works Manager, interview , May 1985

⁸⁹*Long Range Plan 1979-81*, Pharmacia Fine Chemicals, 1978, p.1

In the period 1982-85 this break with the planning and internal coordinative traditions is coupled with changes in the Umeå production activities. By introducing a more flexible production system, keeping semi-assembled instruments available at different levels of production, customers' requirements are more rapidly met and at shorter notice without too much material being tied up in inventories. Experiences in the beginning of the 80s have shown that customer requirements from customers active in the new biotechnology can change quickly. During the period 1982-85, the extended plant is successively adapted to increasing demands for flexibility.

New technological directions

The changes in the Umeå plant during the period are closely connected to the important technological changes affecting the biotech operations. The new FPLC system becomes an important step in the process of creating integrated systems; the new system is more than before based on an integration of instruments, chemicals and methods. The new system makes it easier to adapt an integrated system to the requirements of academic research organizations, to industrial research and production and to customers using the systems for analytical purposes. In 1983, the Separation Product Division also launches an automated version of the FPLC system with an integrated computer-based control unit, the so-called LCC-500. Pharmaceutical customers integrate the FPLC system in the development of allergy vaccines and in the purification steps when producing Interferon on an industrial scale. The first up-scaled versions of the FPLC system are sold in 1984. Apart from the shortened separation times, the new system reduces the number of separation steps and end products have a higher degree of purification, compared to that reached by older chromatography systems.

Also in the biotech group's other product areas, a number of successive product improvements are made during the period. New and faster gel media are launched in 1983, some of which are aimed for the growing group of industrial process customers in the pharmaceutical industry and to some extent also in the food related areas. A new patented separation chemical for the new FPLC system is launched during the same year, the so-called MonoBeads. Among the accessories, after the launching of a completely new fraction collector, FRAC 100, there are clear indications of sales success.

The five basic product areas established in the preceding period - chromatography media, cell biology & biochemicals, laboratory equipment, electrophoresis and industrial equipment - continue to be the foundation for technical improvements. The aim to create the largest possible synergy between chemicals and apparatus/instruments which has been established in the long range plan 1979-81 is emphasized further in the R&D after 1982.

The wish to expand the technology to customers and areas which are not dependent on governmental funds is also stressed. The Division continues to exploit its products, techniques and know-how outside established academic research, for instance, routine applications within health care and new technological areas among pharmaceutical customers.

The acquisition of P-L Biochemicals in 1982 means that the Division takes a major step into molecular biology. The Division's own development of products for nucleic acids and proteins connected to molecular biology research which is started in the 70s, is in 1982 extended as P-L's molecular biology chemicals are added to existing products and techniques. In November 1985, several years of R&D of the instrument development unit in Uppsala result in the launching of the so-called Gene Assembler. Complementing P-L Biochemicals' molecular biology reagents, Pharmacia develops the first gene machine of European manufacture for molecular biology researchers. The Gene Assembler is introduced to pharmaceutical customers and researchers active in modern genetic engineering to manufacture and screen synthetic genes for possible use in the diagnosis of disease or the production of various pharmaceuticals.

It has been estimated by the Division that in the period 1978-81 around 40 percent of total product sales will come from products that have been launched not more than three years before. This proportion is maintained or is slightly increased after 1982; that is, the proportion of "new" products is increasing. This strategy has already been established in the 1977 plans, but has been acknowledged as being risky:⁹⁰

This means that we are faced with two kinds of risks for a large proportion of our sales; one risk in development and one risk in marketing. This analysis shows how extremely important it is that we pick out the right ideas and carry them through to products our customers want.

The Division in certain respects continues on an established path; to be a company in the forefront of products, techniques, systems and know-how for advanced cell and molecular separation in research. The choice to work with technologically and scientifically advanced products also means that the Division further stabilizes the basic idea to develop products which require specific methodology, complementing product sales with methodological knowledge on a high scientific level. Application support services to R&D laboratory customers are established as an important part of the supplies to customers.

⁹⁰*LRP 1979-81*, p.7

Complementing two existing long-term research ventures, the Biotechnology Group also starts anew in 1984. The established cell biology research venture BioCell, 82 percent owned by Pharmacia and the rest by external researchers, continues to develop techniques and products for cell cultivation. Bionova, the planned six year project started together with STU and Uppsala University in 1981 enters its third year in 1984 and continues to develop ideas, knowledge and methods in the expanding recombinant DNA technology. In 1984, a third major venture is started with the purpose of developing a completely new and promising analysis technology, biosensors. Biosensor AB is expected to have significant importance for the Biotechnology Group's future product program. In addition, new investments in the two research laboratories in USA and in a new laboratory for developing customer service and application research in Japan are made in 1984. Overall, the many R&D investments in 1983-85 are responses to the rapid expansion world-wide of biotechnology and bio research.

Taking a step into molecular biology: the acquisition of P-L Biochemicals

When Pharmacia signs an agreement in December 1982 to buy all assets and know-how of the US company P-L Biochemicals Inc. in Milwaukee, Wisconsin, it means that the Separation Products Division strengthens its global position in the rapidly expanding area of supplies for biochemical research, within what is called molecular biology. In September 1984, in connection with the completion of a major extension and reorganization of the molecular biology laboratories in Milwaukee, the Manager of Pharmacia's Biotechnology Group describes the acquisition of P-L from the Pabst Brewing Company as a radical change in the history of the Division:⁹¹

Instantly, we became a leading supplier of molecular reagents. Combined with our strength in instrumentation, P-L served as springboard for us to become a world leader in providing high quality, innovative instruments and reagents to the molecular biology market.

The Biotechnology Group's position in the forefront of the new biotechnology is crucial for the acquisition of the American company. Few companies at this time are aware of the business potential in the area of fine chemicals for molecular biology research:⁹²

When we bought P-L we could see that the company was in fact a step ahead of the development in the new biotechnology at the time. Molecular biology was an area which we wanted to be positioned in, via our biochemicals. After many months of discussions and negotiations we were able to acquire the company, and in just one move, the Biotechnology Group became much more modern and technologically up-to-date. It was important to have a foothold early in the molecular biology area.

P-L Biochemicals (Pabst Laboratories) is part of the Pabst beer breweries when it is approached by Pharmacia. The company's experiences from using yeast - one of the

⁹¹Managing Director, Pharmacia Biotechnology Group, *Pharmacia News*, No 5, April 11 1985, p.6

⁹²President, Biotechnology Group, interview, Spring 1994

oldest known compounds for biotechnological processes - is the foundation for its expanding fine chemical research and production. It is an excellent substance for isolating various chemical substances. Pabst Laboratories grows and is uncoupled as a separate business venture for sales of fine chemicals to molecular biology researchers, mainly in USA.

Officially, P-L Biochemicals' operations are grouped under the control of Pharmacia Inc., Pharmacia's American daughter company. The integration of the company's products and operations gains speed in 1983. Cooperation between Umeå, Uppsala and Wisconsin is started. The Biotechnology Group's three promising products in the molecular biology area have to be integrated with P-L's product range; joint, strategic product planning needs to be initiated, and this does not evolve without problems:⁹³

Despite the fact that we were anxious to let our molecular biology R&D group and P-L's R&D group keep their identities, it was necessary to merge the strategic planning and R&D operations. There were initially, open tensions and disagreements between the Swedish and the US R&D units.

Despite increasing competition in the competitive American market, P-L manages to launch a number of new chemicals for laboratory, biotech customers. In 1983, the products are introduced through some of Pharmacia's subsidiaries, in the USA and Europe. For the European subsidiaries, stocks of P-L's fine chemicals are built up both in the central warehouse in Uppsala and in the local subsidiaries. Concurrently, investments in 12,000 square meters of new laboratories increase P-L's production capacity considerably. Plans are set to extend P-L's production program during the next year and to start technological and product coordination with the R&D unit for the Biotechnology Group in Uppsala. A large program is launched in 1983 to coordinate activities in the area of affinity chromatography. The latter area promises to be an important spearhead for reaching the large-scale industrial companies in the pharmaceutical industry. The creation of the so-called Affinity Workshop, a service concept oriented towards these customers is another step in this direction. In 1984, P-L contributes with over 40 new chemicals for affinity chromatography on a laboratory scale. Joint projects between Milwaukee, Uppsala and Umeå are started in order to integrate R&D and production and move towards a higher degree of integration between molecular biology chemicals, instruments and methods.

However, the integration process is not without problems. The problems appear - not unexpectedly - in the marketing and distribution operations, and not so much in the R&D and production activities:⁹⁴

⁹³Ibid

⁹⁴Ibid

In one way, the integration of P-L was easy. The company's role in Pharmacia was quite clear. It was going to supplement the Biotechnology Group in the molecular biology area. It was a role which we had tried to develop internally, but we were only in the first stages. They took over this role, almost completely. With our large R&D project organization we were not able to develop as fast the many diverse fine chemicals that were needed in this area. And we did not have the knowledge.

Distributionwise, however, it proves more difficult to integrate the new company in the Biotechnology Group:

But the problems came in the subsidiaries. It is always difficult to transfer a whole new product range. This was a major break in the distribution tradition of the biotech group. We had a logistical problem. P-L had a very broad range of products, packed in very small bottles. Many of the products are perishables which need to be kept frozen, and to many customers they were at the time delivered with couriers. So, the first problem appeared in the central warehouse in Uppsala where stocks of P-L's very special products were to be built up.

Successively, the warehouse in Uppsala is adapted to the new products. P-L's warehouse in Wisconsin keeps the central stocks for the US market. By and by, the largest subsidiaries in Europe invest in new warehouse facilities which are adapted to the handling of P-L's products.

The acquisition also means that P-L's ongoing internationalization process changes direction, mainly involving its activities in Europe. The major change concerns P-L's operations in Germany. P-L's German subsidiary with offices at several places is the center of the company's sales activities in Europe. In 1982-83, Pharmacia successively takes over the activities, transferring the sales operations to the Pharmacia subsidiaries. In those European countries where P-L uses agents, all agent contracts are discontinued:⁹⁵

It was not too difficult to "phase in" P-L's sales activities in our subsidiaries' operations. The timing was good, while P-L was just in the early beginning of a radical international expansion at the time. Financially, they were also in an urgent need of money at the time, in order to be able to achieve this international expansion.

In 1984, when the new Biotechnology Group is created, one of the three new divisions, the Molecular Biology Division, is focused on providing products and systems for academic molecular biology researchers and, to a lesser extent, to researchers in the pharmaceutical industry. In contrast to most of the Division's small and often localized competitors, the new Molecular Biology Division is able to reach molecular biology researchers via a global net of marketing subsidiaries. No other molecular biology supplier can boast as large a distribution net for these products in 1984.

⁹⁵Ibid

The total market is expected to grow by 30 percent a year, and between 1983 and 1984 the new Division increases sales from 45MSEK to 67MSEK, a 48 percent sales increase. Most important are still the American customers, but in 1984 the new Division directs attention to the European market, launching new marketing campaigns. When the Molecular Biology Division in 1985 launches the first European so-called "gene machine", the Pharmacia Gene Assembler, it is an important step in the integration of Pharmacia's know-how in instruments/apparatus with P-L Biochemicals' special reagents and molecular biology chemicals.

The spotlight on industrial process customers

The outspoken wish in the long range plans of 1978 for 1979-81 to expand to customers and into areas not dependent on governmental funds (outside the dominating group of academic customers in universities) leads to an increased interest in approaching health care customers with routine applications and the large group of pharmaceutical organizations using industrially adapted purification systems. Connected to the latter group are also organizations in the environmental area and companies in the food industry. The spotlight is directed towards private and government financed industries, and manufacturing facilities producing: 1) pharmaceuticals of biological origin, e.g.. plasma proteins, insulins, therapeutic enzymes and vaccines, 2) natural product and synthetic pharmaceuticals, e.g.. hormones and peptides, 3) biochemical products for research and diagnostic use, e.g.. research enzymes and pure proteins, 4) foodstuffs requiring specially prepared additives, e.g.. preservative enzymes and colouring substances, and 5) materials through processes giving undesirable waste products which can be regenerated or cleaned up by large-scale separation methods, media and instruments. It becomes a matter of extending and exploiting the knowledge of large scale chromatographic separation. The Separation Product Division has long experience by now and reference customers in the pharmaceutical industry on insulin purification by ion exchange and gel filtration methods. The introduction of pilot plant installations worldwide is begun.

In 1982-83, there is a renewed interest in the industrial process customers, but now as a consequence of the fact that the new biotechnology and the research results need to be taken out of the laboratories in the academy, in the private R&D ventures and in the pharmaceutical industry. However, the first years of the 80s become disappointing, as stated in official announcements in 1983:⁹⁶

The pace of development in biotechnology follows the innovative technology's own laws, rather than the more short term time perspectives of the stock market. There is hesitation concerning the next step in the development and the transfer from laboratory scale to large scale applications has in

⁹⁶*Annual Report 1983*, p.13

1983 been relatively slow.... As the economy in a biotechnological process is dependent on exchange and purity of the substance that is produced, an efficient and effective separation technique is a critical step in all types of biotechnology.

The development of new large-scale gel media and apparatus becomes important, and the creation of the so-called Affinity Workshop in 1983 is an attempt to create a unit specialized in providing specially adapted media and services to process scale customers. The period 1982-85 is a period of transitions; the large scale systems are established among pharmaceutical companies using the systems for purification of well-known biological drugs, and among pharmaceutical companies taking the first steps into the process of large scale production of recombinant DNA based substances. In 1985, a number of pharmaceutical customers are in the process of up-scaling and the Process Separation Division of the Biotechnology Group increases its sales by 31 percent between 1984 and 1985. Despite the fact that the Division experiences a rapidly increasing competition 1983-85 (from Millipore Corporation., Amicon Corporation, and partly also from LKB Produkter), it generally considers itself the world leading supplier of separation media and systems for the purification of established biological drugs, as well as substances produced by recombinant DNA organisms. The trend among the pharmaceutical manufacturers towards changing over from synthetic drugs to DNA derived substances seems to continue.

By 1978 it is acknowledged that the industrial process scale customers have to be treated differently compared to the established laboratory customers. The successive change in handling the contacts with these customers is accentuated after 1982, and follows largely the predictions concerning necessary organizational measures are presented in 1978. A change has already been noted during the late 70s:⁹⁷

We have noted a change in the industrial market from small sale/unknown application business to large/scale known application with direct involvement from Pharmacia Fine Chemicals.

The awareness of the fact that the contacts with the industrial customers need to be handled in a different way increases. It is recognized that the lead time from initial customer contact to purchase order is longer than for the established laboratory product lines. Close contact between the (Industrial) Product Group and the customer is aimed at keeping lead time to a minimum. Subsidiary/Export Group contact with customer and Product Group is considered extremely important in this process.

By the late 70s, this results in a number of new priorities. It is stated that the more intense and time consuming contacts with industrial customers requires a new, adapted coordination between customers, the subsidiaries, the central Export Department in

⁹⁷Marketing Strategy, *LRP 1978-81*, 5.3, p.27

Uppsala and the Industrial Product Group. It is acknowledged that the subsidiaries and the Export Department "will increasingly be involved with industrial sales in major and key areas". This concerns the recognition of potential applications and feeding back to the Product Group, and contributing to market analyses of potential growth areas of the Industrial Product Group, contributing to the direction of technological development. It is also openly stated that the subsidiaries have a crucial position, being close to the existing and potential industrial customers. This gives them important roles of:⁹⁸

Organizing and maintaining customer contact, developing opportunities for the Product Group to develop customer interest into purchase. The sales outlets have a key position in initial stages putting the customer on a critical path of purchase.

The role of the central Industrial Product Group is also adapted, and already in the late 70s, the process of adapting to the new forms of contacts with the industrial customers is begun. The central product group needs to start reporting back, defining and subsequently informing the subsidiaries of potential applications and growth areas, provide them with more thorough background knowledge of industrial separation technology, provide reference customers, and also work through traditional marketing channels by publishing results of in-house R&D work in journals. However, the most significant internal, coordinative change in the 70s and in the 1982-85 period is the increased tendency of the central industrial product group to participate together with the subsidiaries in the visits to industrial process customers. This is established already in 1978 as one of the central undertakings of the central industrial product unit. According to the support program they will now:⁹⁹

Accompany subsidiary export personnel on well-selected customer visits as well as organize seminars and participate in major congresses and local meetings considered to be of importance for promotion reasons.

Among the potential separation technologies for large-scale separation, e.g.. ultrafiltration, sedimentation, phase separation, centrifugation and chromatography, the last named proves to be the most efficient as regards general separation abilities, and also suitable to the needs of specific customers in the pharmaceutical industry, involved in the production of plasma proteins. During the period 1982-85, large scale chromatography becomes the established technology of systems manufactured for the growing number of industrial customers.

The creation and dissolution of Biolink

In this period, Pharmacia's former cooperation with Alfa-Laval is resumed. The idea to start a separate joint venture company, specialized in developing bulk chemicals for

⁹⁸Ibid, p.27

⁹⁹Ibid, p.28

companies adopting biotechnological processes, emerges in the early 1980s. It is time to formalize the cooperation and the ideas. Talks and negotiations in 1984 and 1985 result in emerging plans for a new separate joint venture company. The negotiations continue in 1985, and early in 1986 the formal contract for a new joint venture company, BioLink AB, is signed.

In April 1986, in Alfa-Laval's and Pharmacia's joint press release, it is announced that the two companies intend to form a new commonly owned biotechnology company. The new company shall have its own managing director and shall work in close cooperation with the Biotechnology Group's Process Division and Alfa-Laval's Swiss daughter company, Chemap, world leader in large scale fermentation technology:¹⁰⁰

The company will provide products and systems for production in a large scale of biotechnological products. The new company will be the first in the world with a clearly defined focus on developing processes and systems for large scale biotechnological production...The future market for product produced with biotechnological methods, mainly within the food and pharmaceutical industries, is considered promising...

The decision in 1986 is preceded by intense discussions and analyses. The conclusions from the analysis made one year before the joint venture plans are officially launched indicate the need for BTG to strengthen positions in pilot and process scale stages of the biotechnological production process (Figure 5.6.).¹⁰¹

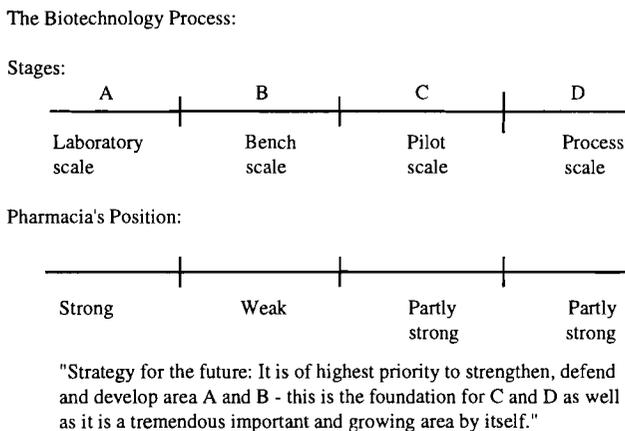


Figure 5.6. Analysis preceding the creation of Biolink.

Complemented with Alfa-Laval's, including Chemap's, strong position in large scale production, the new joint venture company will above all strengthen the position in the pilot scale area. The advantages forwarded when the plans are made official are

¹⁰⁰Joint press release, April 1, 1986, transl.

¹⁰¹Pharmacia Biotechnology, internal analysis, 30 September, 1985

summarized. For BTG, the joint venture will contribute engineering competence, Alfa-Laval's network contacts in process industries, and know-how in fermentation technology and membranes. For Alfa-Laval, it will provide a link and strong position in biotechnology, a knowledge base for future positioning in biotechnology, biological-chemical competence, a link into the laboratory market, and opportunities to become product system supplier in large scale production with the help of BTG's bulk chemicals. The new joint venture is expected to create synergies and a faster growth, several future opportunities for "cross-fertilizations" and "multi-marketing", scale economies, and opportunities for division of work, where the mother companies can focus the use of resources. During the spring 1986, the discussions and planning procedures result in ideas of a new division of work, and a model for the role constellation begins to take shape. Pharmacia BTG shall above all deliver separation media, culturing media, special equipment, instruments and know-how in the lab area to the new joint venture, including membrane technology, while Alfa-Laval's main contribution will be large scale supplies and equipment engineering. (Figure 5.7.).

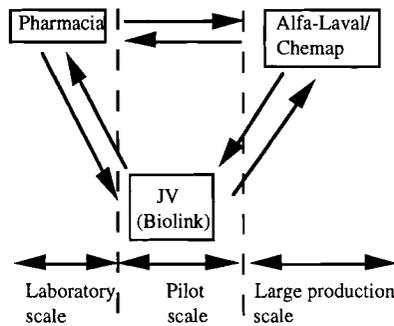


Figure 5.7. Overall division of roles between Pharmacia, Alfa-Laval and Biolink

In the Spring 1986, a managing director for the new joint venture company is recruited externally, and it is decided to locate the new company to the Uppsala region. Alfa-Laval is to have 55 percent of the ownership, leaving 45 percent to Pharmacia. It shall encompass Chemap AG in Switzerland and Alfa-Laval's biotechnical centre in Tumba outside Stockholm and construction and engineering resources from Alfa-Laval's Tumba premises. The major part of Pharmacia BTG's Process Division is to be integrated in the new company. This also means that the remaining mother organizations of Alfa-Laval and Pharmacia BTG shall become suppliers of components and systems to the new joint venture company, at prices equivalent to 75 percent of estimated prices to end users. Intense discussions concerning rights to know-how, technologies and competition involving the three companies Alfa-Laval, Pharmacia and Biolink (the name later give to the new company) result in formal five year contracts being signed in mid 1986. In total,

200 people are to form the new company. It is estimated that in two years time, Biolink's yearly sales shall be 500 MSEK.

Plans for the marketing operations are also outlined. From the outset, Biolink is to use both Alfa-Laval's and Pharmacia's established marketing channels in most markets. However, the estimated sales potentials for the new company's products motivate the decision to invest in separate, exclusive marketing channels in USA and Japan. Successively, Biolink is to establish its own sales channels in the other markets.

Organizational processes are started in the middle of 1986, but within a year the new joint venture is dissolved, despite the large efforts put into planning and initiating the reorganization process. The idea to join forces with Chemap AG and Alfa-Laval proves difficult to carry through. The new company immediately finds itself in the process of trying to combine the opposite requirements of Chemap and the Process Division:¹⁰²

There proved to be too big differences between the two organizations. The venture lasted about two years (it was formalized only about a year). The whole venture was built around the idea of combining the know-how and resources of the two organizations, but they both started to pull in different directions. There were also cultural differences between the two.

A few customers buy the new chemicals, but the customers are not considered mature for the new products. The dissolution of BioLink comes during the turbulent period when LKB is to become part of the Biotechnology Group.

1984-1986: reorganizations in Pharmacia and reorganizations in the Separation Products Division

As a result of the expansion of the whole Pharmacia Corporation - the Diagnostics and Pharmaceutical Divisions are also expanding during the first years of the 80s with a peak in 1982 - a radical internal reorganization takes place in the beginning of 1984. The reorganization of the corporation and of the separation product units is indirectly triggered by the rapid expansion of the Pharmaceutical Division's ophthalmology operations and the success of the new product Healon. In only a few years, the eye surgery product and complementary products have become Pharmacia's single largest product area. This and new R&D ventures in the Pharmaceutical Division motivate the reorganization in new business areas in 1984. The corporate reorganization is complemented with internal alterations within each of the three main product areas, separation products, diagnostics and pharmaceuticals. Former Pharmacia Fine Chemicals, which later becomes the Separation Products Division, becomes involved in a continuation of the decentralization process initiated in 1980.

¹⁰²Ibid, p.28

As of January 1, 1984 the Separation Products Division becomes the Biotechnology Group, encompassing the Separation Products Division, P-L Biochemicals and the R&D ventures Bionova and BioCell. The rest of the corporation, (except the two agency companies Meda and Famaco) forms the new, joint Pharmaceutical & Diagnostics Group:¹⁰³

The new organization reflects a division into the two major business fields of the corporation. The Biotechnology Group is the smaller of the two with around 25 percent of corporate sales. On the other hand, the Group constitutes Pharmacia's spearhead into the frontline of biotechnology research. In that respect, the Group is as regards new technological ideas equal to the Pharmaceutical and Diagnostics Group.

During 1984, the Biotechnology Group continues on Pharmacia's road of decentralization and three new biotech divisions are formed, of which the first two encompass three separate business areas each.

Behind the division into business areas lies the idea of forming central, supporting product groups, each with a defined biotech customer group. Each business area belongs to a Division with its own operational Division Manager. Despite the fact that P-L Biochemicals is placed in the group of new, organizationally separate R&D ventures (BioCell, Bionova and Biosensor), the coordination and operational integration between the Uppsala based Molecular Biology Division and P-L is strengthened also after the reorganization. In 1985, a large part of BioCell's resources are transferred to the central research function in Uppsala to assist various projects and thereby end its operations as an independent venture.

The product ranges that the three new biotech divisions are given to control are distinctly different. The Laboratory Separation Division now controls the sales of around 400 different hardware products; instruments, media and accessories. The Process Separation Division only markets around 65 products of the same types, while the Molecular Biology Division controls a range of over 1500 different chemicals and gel media. The central warehouse in Uppsala becomes the central distribution point for all products, but intermediary stocks are also built up at production level, in the subsidiary organizations and in connection to the users' applications.

The next major step in the formal, internal reorganization of the Pharmacia corporation is valid as of January 1, 1986, and only indirectly concerns the new Biotechnology Group. As a result of the changes, Pharmacia's business organization is for sales purposes divided into four profit centers of approximately equal size: Biotechnology, Health Care,

¹⁰³ *Annual Report 1983*, p.11, transl.

Pharmacia Ophthalmics AB and Pharmacia Diagnostics AB. As stated in the official descriptions of the internal change, the Biotechnology and Health Care Groups now form two equally important corner stones of Pharmacia:¹⁰⁴

Biotechnology and Health Care form the base of the new organization. These units have been assigned the tasks of expanding their operations among the target groups that have now been selected, and developing new areas of activity and technology bases. They also have the special task of utilizing the Group's internal synergistic effects through cooperation between profit centers.

Despite the increasing organizational and operational disintegration of the four major business operations both in marketing and in production, the technological synergies are still considered important. As stated by the Pharmacia President in 1985:¹⁰⁵

Many consider Pharmacia to be one of the most attractive medium-sized companies operating in the biotechnology field. Several factors contribute to this view, for example the Company's close relationship with Uppsala University, its strong financial situation and its internationally well-developed marketing organization. But, after all, perhaps the most attractive feature is that a single company accommodates such a broad spectrum of competence. The interfaces between these areas serve as a natural and fertile ground for innovational growth. Accordingly, it is my conviction that Pharmacia has very good chances for exploiting new knowledge generated by biotechnological research.

The new financial situation will result in a number of new acquisitions, mergers and organizational changes in 1986, affecting not only the central organizational units but also the long established marketing subsidiaries. A large number of new problems are coming in focus. The Biotechnology Group, the Pharmaceutical Group and the Diagnostics Group will all be engaged in a number of acquisitions and mergers which together will come to change the whole structure of Pharmacia. The chain of internal reorganizations in 1984 and 1985 will prove to be only the peaceful beginning of much more radical changes, starting with a number of acquisition and merger processes in 1986, including the fusion with one of the main biotech supply competitors, LKB.....

¹⁰⁴Annual Report 1986, p.12

¹⁰⁵Pharmacia President, Annual Report 1985, p.5

6 In the Slow Flow of a Moving Organizational Context: The Pharmacia Corporation 1911-1995

The moving industrial context of which Pharmacia Biotech is a part during the period of radical change 1986-93, is not a singular context but a multiple, multifaceted one. As supplier of biotech equipment to the most important application industry - the pharmaceutical industry - Pharmacia Biotech becomes a part of the short- and long-term movements in this industry. However, the radical change processes become connected to the pharmaceutical business context in another important way. The endeavours of people and groups in Pharmacia Biotech to redirect the organization in the mid 80s are inextricably intertwined with the company's historical background in the Pharmacia Corporation, a pharmaceutical company with a history in drug manufacturing since 1911. When Pharmacia Biotech reorganizes its marketing and distribution operations, these processes become part of the efforts to cope with history; to live with and break free from the stable elements of "the pharmaceutical background". It means relating to the twisting course of the mother corporation's history, to the long-term changes in external network positions, roles and internal organization.

Some of the historical seeds planting the stability are created way back in time. They remain elements of continuity in the organization, while successively changing their outward characteristics. Thus, when a new marketing and physical distribution structure is created in Pharmacia Biotech, this means breaking with a stable "pharmaceutical" distribution tradition which has been established in the very beginning of the company's existence, but which over time has changed in outward characteristics; it is becoming more efficient, the internal coordination of distribution is being improved, etc. The process of uncoupling from the history of the pharmaceutical origin also encompasses the need to develop a more business like buyer-seller relationship with other divisions and companies in the Pharmacia Corporation.

LONG-TERM TECHNOLOGICAL SHIFTS: TRANSITIONS AND TENSIONS

Underlying Pharmacia's history of organizational changes is the less visible history of long-term technological shifts and transitions. These shifts are coupled to the organizational tensions and reorientations, internally and externally, to R&D counterparts, to new customer groups, etc. The history of the company encompasses long-term technological movements when former dominating technologies during transition periods compete with new technologies moving towards dominance. There appear in Pharmacia over time new tensions between the technology and the changing inter- and intra-organizational contacts and relations, and as the story and the context become more complex and the company grows, tensions appear between the many organizational contexts that meet within the corporation. When Gustaf Felix Grönfeldt establishes the new business venture Pharmacia in 1911, it is far removed from the technological and organizational situation that exists 80 years later, in 1991, when Pharmacia is in the middle of a turbulent reorganization. It has become increasingly difficult to define what now constitutes "Pharmacia". Is it a company, or is it a conglomerate of companies? Or is Pharmacia in fact a number of overlapping, inter-penetrating networks of companies, where some of the organizational units can claim to have a longer-term history and central position in the conglomerate? Whatever the answer, the emerging organizational complexity has an underlying technological history, with both long-term waves and small ripples of change which lead the company in new technological directions.

In this perspective, the eight decades can be seen to encompass three overlapping, long-term waves of technological continuity, where each transition period - when a new technological wave succeeds and starts to dominate the preceding, dominant technology - is both troublesome and coupled with tensions, ambiguity and organizational changes.

The first technological era

The *First Technological Era* of Pharmacia dominates the first 25 years of existence, until the mid 30s. It is the intermediate, almost "herbal medicine" era, when the company remains with one foot in the chemist-based pharmaceutical tradition of the 19th century, while taking a step into the new, industrialized era of large scale chemical-pharmaceutical production. Founded on one principle product, Phospho-Energon, and a number of complementary standard products - pills, ointments and medicines for colds, headache, skin diseases and the like - the first technological era has a clear dominance until the late 20s and early 30s.

Despite the fact that the first obvious signs of Pharmacia's stepping into a new technological era can be located to a number of significant events in the 1930s and early 40s, the first technological wave contains early warnings that something new is on the way. More and more of the production activities are transferred from doctors and chemists into the factory building of Pharmacia - the first small steps towards large scale production are taken. Pharmacia also introduces new routines for controlling, testing, patenting and registering products and processes, which is another step towards a new, coming era of pharmaceutical product development and production.

Apparent signs that the company is entering a new - the second - technological era come in the late 20s and early 30s, and much as a consequence of new external R&D contacts and the introduction of new industrial, chemical-pharmaceutical production processes. In 1928, Pharmacia decides to reduce the number of standard products and focus on the development of new, original pharmaceutical products or develop improved versions of existing foreign products. A wholly new research laboratory is invested in and new wholly owned drug farms for supplying raw materials are established outside Stockholm. In 1937, Pharmacia starts industrial production of sulpha drugs, after achieving the licence from a Swiss manufacturer. The chemical-pharmaceutical, "industrial" era is thereby entered. Concurrently, intense contacts develop between the new R&D department and Stockholm's University Hospital, Karolinska Sjukhuset, resulting in Salazopyrin, a new drug for rheumatism, later to used also to treat ulcerative colitis. A second important event, which definitely takes the company into a new era, comes in the early 40s, when contacts with the University of Uppsala are established.

The second technological era

The *Second Technological Era* can also be denoted "the dextran era", as many of the technological achievements from the mid 40s originate from research and development on, and production and marketing of, dextran based products. Apart from the production process influences between the Salazopyrin path and the dextran path, they evolve largely uninfluenced by each other. Technologically, all major divisions and companies of the Pharmacia Group will have a stable, common base in the dextran activities during the second, industrialized era of Pharmacia's technological development. The technological branches of the dextran tree will become the base for substantial growth, and of increased organizational complexity.¹ The infusion solutions Macrodex and Rheomacrodex and other blood plasma substitutes are born. On the basis of experiences gained in the experiments with cross-linked dextran the new so-called gel filtration separation method evolves, giving birth to a new product, Sephadex, and a wholly new division and

¹Annual Review 1978, p.31

business area. Experiments with cross-linked dextran, and antigens and antibodies in the 1960s later result in the development of analytic aids for disease diagnosis. In collaboration between Pharmacia, Uppsala University and researchers in USA it is found in experiments that antibodies which have been bound to cross-linked dextran can be used to bind antigens in a blood sample. The RIST and RAST tests, and the new Diagnostics Division are born. Next, in collaboration between the Pharmaceutical Division, the Separation Products Division and external partners, experiments with cross-linked dextran show that dextran has the capacity to absorb liquid in tissue around wounds. It facilitates blood circulation around the wound and helps to remove bacteria and secretion products which prevent the wound from healing. The wound cleansing product Debrisan is born, and another success product for the Pharmaceutical Division.

In the late seventies, collaboration between all the three main divisions, Pharmaceuticals, Diagnostics and Separation Products, results in a new dextran based diagnostic product. The three divisions' knowledge in pharmacology, allergy tests and separation methodology results in the new allergenic extracts. The technological branches of the dextran research parallels the development of a completely new organizational structure for the Pharmacia Corporation.

The externally oriented changes in the 80s either contribute towards or confirm the new division into three, main and distinct - and to a large extent dextran based - business operations. While the technological links and internal contacts between the three divisions remain, the organizational networks which are now built around the three groups of activities weaken the technological links, pulling the three divisions in separate directions. A global technological change, the emergence of the so-called "New Biology" or "Biotechnology" in the early and mid 70s, becomes a new common denominator.

The third technological era

The *Third Technological Era* of Pharmacia circles around the achievements within this new global, technological movement. From the mid 70s and most apparent from 1979 and onwards, Pharmacia begins to describe itself as a biotechnology company, a company whose common ground is the central position within "the new biology". The Separation Products Division's R&D and customer contacts become an important locomotive for leading Pharmacia into the new genetic engineering and cell fusion sciences and basic research areas, and its subsequent branches of applied research and industrial applications.

The 80s is an important technological transition period for Pharmacia. The internal technological links of the "dextran era" remain, but new technological forces - coupled

with a multitude of internal and externally oriented organizational changes - move the company into the biotechnology age, new organizational structures and new industrial, inter-organizational networks. The original, technological bonds between the company's three main divisions are partly dissolved, partly driven by a number of organizational changes escalating towards the beginning of the 90s. After a few years of ambiguity and reorganizations, the former Pharmaceutical and Diagnostics Divisions are eventually integrated in a new giant corporate structure with a growing number of successively added technologies: for example, new technologies connected to therapeutics, self care, smoke cessation, plasma products and peptide hormones resulting from the integration of Leo and the Kabi Group, and to oncology and immunology in the integration with Italian Erbamont. Concurrently, the technological links with the former Separation Products Division are successively dissolved as a new separate company is established around the production and marketing of biotech supplies. The new biotech company moves into new technological areas connected to laboratory and large scale purification, and molecular biology research.²

The technological shifts in the history of Pharmacia are inextricably interlinked with both changes in the way the companies' internal units connect to external organizations, and to the way the internal units connect to each other. The history of strong internal R&D contacts between Pharmacia units creates tensions when the company enters the 80s and each of the three main divisions connect to, among themselves, new and different customer groups, and acquires companies which are integrated with the network of units now making up the new "divisions". Historical, technological links cannot stop the process. In 1992, when Pharmacia Biotech is formally established, it is another step in the dissolution of historical bonds between Pharmacia's former Pharmaceutical, Diagnostics and Separation Products Divisions.

LONG-TERM CHANGE AND CONTINUITY IN POSITIONS, ROLES AND INTERNAL ORGANIZATION

The moving organizational context of Pharmacia takes the corporation through periods when the external network positions, the roles and the internal organization change course of direction. During different periods in Pharmacia's development, different changes -

²The long-term movements of technological stability and change are also coupled with short term technological "ripples", new minor paths are taken, some of which are later abandoned. Thus, organizational events in the 80s, connect Pharmacia to the technologies of immunodiagnostic systems, via Wallac and US company ENI, to clinical electrophoresis via Sebia, and to infusion pump technology, via Deltec Inc. Later divestments divert Pharmacia from these areas. Ambiguities and difficulties of this kind become more common during the third era, perhaps best illustrated by the difficulties in handling the former subsidiary companies of LKB Produkter, Wallac and Biochrom.

associated with new problems and driving forces - come to dominate. The long-term organizational movements can be summed up in three periods (partly overlapping with the three "technological eras" described above):

1911-1960	Emergence and Stable Growth of a Pharmaceutical Manufacturer
1960-1980	Emergence of a United Biotechnological Corporation
1980-1995	Emergence of a Multinational and Diversified Pharmaceutical, Health Care and Biotech Corporation

During the first fifty years of existence, 1911-1960, the company's firm position in pharmaceuticals is established. Exchange relationships with pharmaceutical customers and a firm foundation in R&D with strong bonds to academic institutions is created, coupled with an internationalization process gaining speed in the 1930s, through licensing and distribution agreements. During the next phase, in the sixties and seventies, the company enters a period of rapid sales growth, business diversification and international expansion. New customer groups are approached via sales of biotech supplies and diagnostic products, and the first steps into the new biotechnology are taken. Three major divisions are unified around the new biotechnology. In the third period, 1980-95, Pharmacia continues on the road of diversification, technological shifts, growth and internationalization. The external expansion takes off with a large number of alliances, acquisitions and mergers, and a number of major internal reorganizations come to radically change the structure of the corporation. Pharmacia turns into a diversified, multinational corporation positioned in the global pharmaceutical/health care/biotechnology network.

Within this context of long-lasting movements in Pharmacia's development - manifested in long waves of changing network positions, roles and internal organizational - Pharmacia Biotech emerges as a biotech supplier.

PHARMACIA 1911-1960: EMERGENCE AND STABLE GROWTH OF A PHARMACEUTICAL MANUFACTURER

A stable foundation in pharmaceutical R&D and production is established

Many of the technological, organizational, behavioural and business culture characteristics affecting Pharmacia's biotechnical separation product organization in the 1980s and 90s are firmly based on the historical development of the company and in traditions set decades earlier. When the Stockholm pharmacist Gustaf Felix Grönfeldt in

October 1911 founds the company Energon - in November renamed AB Pharmacia - it is already from the outset declared that the business will be to synthesize and:³

....make use of scientific progress within pharmaceutical, chemical and technical areas.

Pharmacia's strong connection with science and research becomes one of the single most important ideological, strategic and organizational backbones of the new business venture. Founded on one single invention - the pharmaceutical multi-purpose product Phospho-Energon - in the small back-room laboratory of the pharmacy Apoteket Elgen in Stockholm, it is at the time generally considered an unrealistic venture to form a company for pharmaceutical manufacturing. Despite the fact that pharmaceuticals by tradition have always been prepared by doctors and chemists, twenty one persons are brave enough to sign the shares for the new business venture. The ability to take daring steps in radically new areas - often based on new technological breakthroughs - will come to characterize several important events in the company during the following decades. The progressive and daring new business venture also encompass visions and ideas that new pharmaceutical products shall be subject to clinical tests together with private doctors and hospitals, and also subject to economic and market evaluations.

A stable foundation in biochemical, pharmaceutical activities with multi-disciplinary ambitions and connections to extensive clinical testing and to academic research develops early. The emphasis on R&D with extensive university contacts is coupled with ambitions to manufacture pharmaceuticals on a large scale. In addition, AB Pharmacia's international marketing activities are introduced early in the company's operations. Within the first year of existence, contacts with pharmacists in Finland result in significant sales of Phospho-Energon in both Finland and Russia. Within a few years, companies in England, USA, Denmark and Norway are selling the product. The internationalization of the company is also founded on the early development of wholesale business in 1914, importing and exporting raw materials and other products for pharmaceutical use. Phospho-Energon becomes one in a limited number of products that successively come to replace one another as important export drivers.

Although extensive R&D is considered at an early stage as one of the central priorities of Pharmacia's activities it is not until the end of the 20s that it is firmly established in Pharmacia's strategy. It is the consequence of the firm's increased external contacts in the early 1920s. Contacts between the Swedish pharmaceutical companies have developed early and have resulted in a manufacturers' association. In the discussions between

³"Nittonhundra elva nittonhundra åttiosex, Pharmacia sjuttiofem år", jubilee book, 1986, p.7

Pharmacia, Astra, Leo, Terapeutica, Arla, Vitrum, Lejonets Droghandel and Kronans Droghandel it is stated that some kind of rationalization of the Swedish pharmaceutical business is necessary. In order to reach economies of scale the division of labour between the companies needs to be improved. The first steps in the long-term process of restructuring and concentrating the Swedish pharmaceutical industry are taken.

In 1929, Pharmacia's new information manager suggests to the board of directors that the company's niche in the Swedish pharmaceutical industry shall be based on a stable foundation in research and new product development. As a consequence, a new, larger R&D department is organized in the beginning of the 30s, an established chemist is appointed R&D manager and a special drug farm is set up outside Stockholm for the supply of raw materials. Efforts are also put into production process development; in 1931, the new factory in Stockholm is considered one of the most advanced in Sweden.

In 1936, after 25 years of business, it is possible to discern some specific Pharmacia characteristics emerging: a stable position in pharmaceutical R&D in the Swedish market, a strong emphasis on few, original "front-line" products and advanced industrial production. Furthermore, both R&D and marketing become connected to a growing international contact network, and continuous contacts with the other companies in the Swedish pharmaceutical industry are established. In 1937, Pharmacia starts production of sulphha drugs, marking the beginning of an advanced industrial, pharmaceutical-chemical production.

Pharmacia's extensive and intense R&D contacts with Swedish and later also foreign universities and academic research laboratories are gradually being established at the end of the 1930s, starting with the cooperation with Karolinska Sjukhuset in Stockholm and the development of one of Pharmacia's most important and export dominant products, Salazopyrin. The next important step in this process is taken in 1943 when contacts between the physical-chemical/biochemical institution at Uppsala University and Pharmacia are established. The university institution in Uppsala approaches Pharmacia to suggest a cooperation venture, based on the ongoing dextran research. Pharmacia's strong links to academic research are thereby further strengthened. The intense exchange of contacts, information, and researchers between the company and the Uppsala University becomes an important base for the company's coming research and development activities.

The manufacturing processes for the new products require the application of new process techniques. Existing manufacturing plants and resources become insufficient. This and

other factors motivate the decision in 1948 to move to new facilities in Uppsala. Another, and one of the most important reasons, is the growing exchange and cooperation with the physical-chemical institution at Uppsala University, a venture which Pharmacia aims to extend to include also other departments. A second important aspect has to do with transports and distribution - the lack of storing facilities in Stockholm strongly influences the decision to move to Uppsala. During the coming years, continuous investments in additional facilities for chemical manufacturing, storing and administration are the open signs of the fact that Pharmacia has entered a phase of stable expansion.

The start of international expansion through licensing and distribution agreements

Pharmacia begins its international engagements within the first year of existence in 1912. The sales of Phospho-Energon in the Nordic countries, in Russia and other European countries and in USA increase, but remain on a moderate level due to World War I.

During the 30s, international engagements increase. What starts as a legal case in 1927 - Pharmacia AS in Copenhagen has taken the same company name, exporting its pharmaceutical products also to Sweden - results in the two companies instead negotiating on a joint venture in 1934 to sell each others products in Sweden and Denmark. The cooperation gradually intensifies. In 1949 Pharmacia initiates discussions on a 50 percent share in the Danish firm. In 1954-55, there is a complete take-over.

In Norway, negotiations with an Oslo pharmacist for the sale of Pharmacia's products are initiated in 1931. The same year, a manufacturing licence deal is signed with another Norwegian firm, AS Farmakon. In 1934, the Finish pharmaceutical firm Star is contracted for the sales of Phospho-Energon. In 1935, licence deals with Idman & Arvela in Finland, for the manufacturing and sales of sun protection products, increase sales activities in Finland, in the Baltic states and in the Soviet Union. An agreement with a Dutch firm in 1937 and an Austrian firm in 1938 are other important steps in Pharmacia's internationalization. The alliance with Dutch Organon encompasses a manufacturing and sales agreement where Pharmacia agrees to produce and sell Organon's hormone based products in Sweden. The venture lasts until 1969 when Organon establishes its own sales company in Sweden. The agreement with the Austrian firm Aktiengesellschaft Odelga in Vienna involves the sales of Ospamur, a natural transplantation substance developed at Pharmacia in the early 30s. Licensing and sales agreements with local, independent companies become the norm for international distribution.

After the war, Pharmacia's internationalization receives an impetus and the strategy for a new form of international expansion are planted, much due to a visit paid to the Mayo Clinic in Rochester, USA by the managing director of Pharmacia and two colleagues in

the company. Dextran products receive much attention and researchers in USA, England and Germany declare an open interest in performing clinical tests on the new products. In order to be close to the Mayo Clinic and the two American researchers responsible for the testing of Dextran (and shortly after also Salazopyrin), John Lundy and Arling Elwinger, a new venture is formed; Pharmacia Laboratories Inc. The small office in New York signals the beginning of Pharmacia's positioning on the American market. Lundy's and Elwinger's personal contacts with people at clinics all over the country and with American food and drug authorities are the foundation for Pharmacia's expansion in USA during the late 40s and early 50s.

At a board meeting in Uppsala in 1948 Pharmacia's international expansion strategy is discussed. It is decided that licensing is to be used in larger markets like the USA, while in smaller countries like Benelux and the Nordic countries, agents can be contracted. In 1953, the new internationalization strategy - to a large extent based on the sales of the new Salozypedin and Dextran products - results in licensing or agency agreements being signed with representatives in a number of countries: Norway, Finland, Denmark, Germany, Benelux, France, Switzerland, England, Portugal, Italy, Egypt, Brazil, Mexico, Venezuela, Colombia, Equador, Philippines, Japan, Hongkong, Jugoslavia and USA. Export sales share of total sales increases steadily.

The basically positive experiences from licensing the manufacturing and sales of Dextran and Salazopyrin in the USA strongly influence Pharmacia's international marketing and physical distribution activities in the 50s. It is considered the most attractive alternative for market entry in a situation where internal marketing resources are scarce. However, successively it becomes clear that the advantages of licensing are being outweighed by the disadvantages - linked to problems of control, coordination, reporting and information exchange. The first step towards the formation of a coordination unit, an international marketing department in Uppsala, is taken in 1957 when an Export Manager is appointed:⁴

The strategy that was established for the development of the international marketing activities was based on the provision of support (promotion material, product support etc.) to licencees. It also included increased control of the agents' activities, education of sales representatives visiting medical doctors and the launching of clinical tests in local markets. There were also plans to establish Pharmacia controlled marketing subsidiaries in the most important foreign markets. These would either complement and work parallel to licencees with new products or take over the old ones.....Simultaneously, it called for a stronger home organization with a deeper marketing engagement.

Due to the characteristics of the products - the export dominating products are pharmaceuticals and consumer products requiring relatively little storage space - and due

⁴Ibid, p.116, transl.

to the general tradition of keeping pharmaceuticals near the end-users in the hospitals or with pharmacies, a large part of the physical storage of products is managed locally.

Pharmacia in the 1950s: the start of business diversification

An important, and predicted, outcome of the move is that Pharmacia now comes closer to the long tradition of basic biochemical research at Uppsala University. The birth of a completely new and different line of business activities connected to separation and purification products, is a direct result of the links between university research and R&D activities in Pharmacia. The very positive test results on the new, dextran based, separation media cause the managing director of Pharmacia to contact the Biochemical Institution to suggest cooperation R&D to form a business project and develop the new media, Sephadex. A whole new competence has to be built up, including investments in new production resources. There is also an internal resistance within the company that has to be overcome:⁵

It was not considered proper and first-rate to manufacture anything that was not pharmaceuticals.

However, the decision to manufacture Sephadex is only the first step in the process. Soon after the launching of Sephadex, Pharmacia has to take decisions concerning the manufacturing of a whole range of new, technical products connected to the gel filtration process. Like with a handful of former Pharmacia products - Phospho-Energon, Salazopyrin and Macrodex - Sephadex becomes one of the important backbones of Pharmacia's product portfolio and international sales and marketing activities.

The year 1959 denotes an important shift in Pharmacia's development as pharmaceutical company. Parallel to the company's established role and the established external contacts with licensees, agents, hospitals and doctors, a new role with new external contacts is added to the former. Pharmacia becomes supplier of research equipment and develops relationships with a range of new counterparts; academic institutions and R&D departments of pharmaceutical companies, including Pharmacia's own organization as one of the most important.

PHARMACIA 1960-1980: EMERGENCE OF A UNITED BIOTECHNOLOGICAL CORPORATION

A new international expansion strategy

In the 1960s and 70s, new roles and positions emerge as a consequence of the fact that Pharmacia directs attention to three significant changes: Firstly, the company definitely breaks with the established tradition of selling, marketing and distributing via agents and

⁵Ibid, p.89

licensees in favour of wholly owned marketing subsidiaries. Secondly, four dominating business areas emerge. Lastly, the company enters a period of growing sales and organizational growth linked to the international expansion. Technological shifts - the establishment of separation products and diagnostics as two new product areas, and new breakthroughs in the pharmaceutical operations - combined with new customer relationships, change Pharmacia's roles and positions in the pharmaceutical industry and in new academic and industrial networks.

In 1958, nine years after the American sales company is established, and with strong positions in the Nordic countries, the first take-over of a foreign agent's business is carried out. Deutche Pharmacia G.m.b.H., the first foreign subsidiary is established. Thereafter, the rapid export increase in the 60s and 70s is paralleled with a radical organizational change; Pharmacia starts the long-term process of taking over local marketing and sales responsibilities, founded on a new net of sales subsidiaries, e.g.:

1962	Great Britain
1965	Canada
1973	France, Netherlands, Japan, Australia
1976	Austria, Belgium, Switzerland
1980	Brazil
1983	Italy
1985	Spain
1989	South Korea
1993	Portugal, Greece

In 1962, more than half of the company's production is exported. In 1967, the new Pharmacia International division is created to support and control the activities of agents and licencees. The new subsidiaries report directly to the Pharmacia Management Group in Uppsala.

Growth and diversification: new emerging business areas

Four distinct business areas begin to crystallize. The new organizational structure, the company's roles and the technologies are born within Pharmacia's pharmaceutical R&D, manufacturing and sales. Initially, the technological links between the four divisions remain strong.

With Pharmacia's stable historical background in pharmaceuticals it is natural that the largest and most important division during the period becomes the **Pharmaceutical Division**. In the late 70s and early 80s, four product areas begin to arise in the division. Within the area of Infusion Products, the old Dextran products Macrodex and Rheomacrodex maintain their importance to the Division. The Division's largest product, Salazopyrin, within the area of Gastro-enterology and Wound Treatment continues to develop favourably during the period. In 1977, the launching of the new wound treatment

product Debrisan further strengthens the stability of sales within this area. Within the third business area - Ophthalmology - the new eye surgery product Healon is introduced in 1980, after many years of research. The introduction of Healon means that the Pharmaceutical Division approaches what is for the company a completely new business area, but within the boundaries of pharmaceuticals and health care. The fourth and last business area - Pharmacia Norden, a separate area for the Nordic countries - is formed with the aim of increasing the company's attractiveness to foreign licensors in the home market.

The story behind the formation of the second division - the **Diagnostics Division** - in 1975, can be traced back to the strategic licensing alliance with the Dutch manufacturer Organon in the 1930s. Among the Organon products licensed to Pharmacia, beside the hormone based products, is a pregnancy test which is an important base in the Organon product range in the 1960s. In addition, Pharmacia has at an early stage come in contact with diagnostics through an R&D relationship with a group of researchers at the Biochemical Institution at Uppsala University, who in turn have been working on diagnostic tests with a group of researchers in the USA. They develop a test method, the RIST-method, for tracing small amounts of, for example, protein hormones like insulin. In 1966, partly as a result of the university contacts, Pharmacia decides to establish a new R&D group with the task to develop diagnostic tests. This, in turn, results in Pharmacia receiving suggestions for a number of additional tests to be developed in cooperation with other external research groups. The first internally developed test is launched in 1969. The new RIST-technique (Radio Immuno Sorbent Test), utilizing radio active insulin as an active substance, becomes a generic technique upon which several subsequent diagnostic tests, like allergy tests, are based. Three allergy tests which are launched in 1972 soon become three of the most important products for the company. In 1974, the diagnostics activities are separated from the pharmaceutical business and a new division is established, the Diagnostics Division.

Also with an origin in the pharmaceutical group of the company, a number of consumer products are developed in the middle of the 60s. As a result of this work, a **Consumer Product Division (Medisan)** is formed. Three sun and skin lotion products, based on the expertise of the Pharmaceutical Division, become the largest products of this home market based business. In 1981, the Medisan group is complemented with a partially owned mail order company for cosmetics, Fleur de Santé.

The fourth division that is established in connection with a reorganization of the mother organization in 1974, is the **Separation Product Division**. The success of the new

separation media Sephadex in the 60s not only leads to extensive sales, but also to extended research within the area. Heavy emphasis is put on the development of chemical media for separation processes. However, more and more technical R&D is performed as the division starts developing laboratory separation instruments. The division enters a period of rapid sales increase, much as a result of the increasing interest among foreign buyers. In 1980, 97 percent of the division's sales is exports. In total, 18 percent of total Pharmacia sales is contributed by the Division. Between 1976 and 1980, the annual sales increase for instruments and media is on average between 20 and 30 percent. The rapid development of the new biotechnology and the growth in the global gene technology 1975-80 is one of the primary driving forces for this growing business.

Remaining internal, technological and organizational, links

During the twenty years between 1960 and 1980, Pharmacia transforms from being a small pharmaceutical company to become a multinational, biotechnical corporation. Despite the increased differentiation there are internal technological (and organizational) bonds between the emerging business areas, shaped by the historical origins. (Figure 6.1)

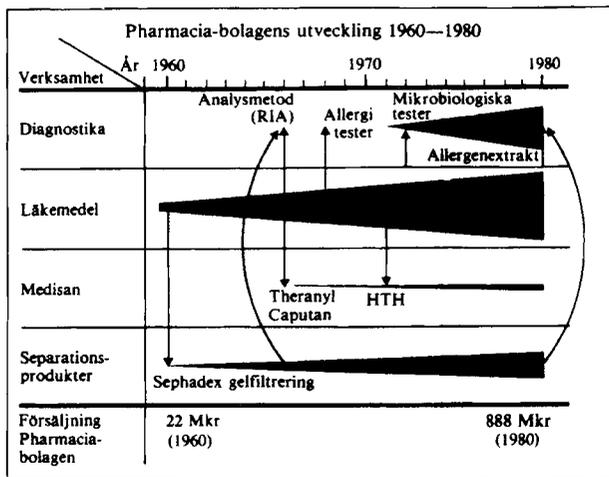


Figure 6.1 Internal product development links between Pharmacia Divisions 1960-1980; Diagnostics, Pharmaceuticals, Medisan, Separation Products. Sales 1960: 22MSKR, 1980: 888MSKR. (Source: Swedish Annual Report 1980).

The Sephadex gel filtration method has been important in the development of the diagnostic tests. Separation and purification techniques within the Separation Product Division has enabled the Diagnostics Division to improve significantly the quality of the new allergy extracts and tests. It has been important also for the development of the new micro biological tests 1975-80. The Pharmaceutical Division has continued to be the important backbone of Pharmacia's business and continues to provide important

technological input to the other divisions, which all have their origin in pharmaceutical R&D and production.

The still strong internal organizational bonds between the four divisions in the period 1975-80 hold together the mother organization in Uppsala. The independence of the divisions increases, but the central, integrating management unit still stamps its clear mark on Pharmacia, coordinating the four divisions, presenting a unified Pharmacia Corporation. Externally, however, the picture is gradually becoming more splintered. Changes in the contacts between the divisions, coupled with obvious changes within each division during the period, are linked with the orientation of Pharmacia towards new types of customers and contacts. The former role as pharmaceutical supplier to hospitals, doctors and pharmaceutical outlets and middlemen is definitely changing, and is replaced by a more diverse and complex set of roles.

The pharmaceutical division's core customers remain, but the emerging success for Healon and other new products leads to changes in the composition of pharmaceutical/health care customers, requiring internal adaptations of sales operations and resources. The growing importance of diagnostic test sales is also coupled with modifications in the customer structure; clinics and clinical laboratories make up a new important customer segment. The Customer Product Division's strong home market dependence and its dependence on established distribution channels, Swedish Apoteksbolaget for example, gives the division a rather special role in the technology driven company. Lastly, the Separation Product Division's rapid sales increase becomes coupled with a change in customers. The traditional academic research laboratories remain, while pharmaceutical R&D units, independent R&D companies, clinical laboratories and governmental control institutions emerge as increasingly important counterparts for laboratory instrument and media sales. The start of up-scaling of separation and purification systems signals another important shift. The new process scale equipment is aimed for a new category of customers; manufacturing departments in the global pharmaceutical industry.

PHARMACIA 1980-1995: EMERGENCE OF A MULTINATIONAL AND DIVERSIFIED PHARMACEUTICAL/HEALTH CARE/BIOTECH CORPORATION

The growing importance of biotechnology as integrating factor

By adopting the new biotechnology as technological foundation, Pharmacia's roles in the global pharmaceutical-health care-biotech complex change. The traditional chemical based pharmaceutical production changes character. Pharmacia's roles are also radically

changed through a number of externally oriented changes. The company enters a period of acquisitions, mergers and formations of strategic alliances. Different years stand out as important in this respect, 1982, 1986, 1989 and 1992-93. Thirdly, partly as a consequence of the inter-organizational changes, this is the decade of intensified intra-organizational adaptation and change. One of the central adaptation problems concerns the internal coordination and separation of the four emerging business areas and divisions for pharmaceuticals/health care, diagnostics, consumer products and biotech equipment.

In 1981, Pharmacia officially acknowledges the fact that the company is directing its activities to the field of the new biotechnology. The future business will be based largely on the progress that is made in this field. As stated in the annual report of 1981:⁶

Biotechnology is a common base for the operations of the Pharmacia Divisions. Developments in this field have been especially rapid, and expectations are great.....The optimism in the field of biotechnology stems primarily from the fact that we have learned two new methods of controlling what cells will produce. These two techniques are:

- Hybrid-DNA technology ("genetic engineering")
- Hybridom technology ("cell fusion")

The Pharmacia Divisions are engaged primarily in research concerning the latter technique.

Front-line research in cell fusion is mainly done in collaboration with the new Institution for Cell Research at Uppsala University and with the La Jolla Cancer Research Foundation in California. Although Pharmacia does not pursue any research of its own on Hybrid-DNA technology in the beginning of the decade, the Separation Product Division provides a link to this technology:⁷

.....but the Group has ample opportunities to follow developments in this technology because companies that utilize hybrid-DNA technology use Pharmacia's separation products. They do so because this technology presupposes the kind of advanced purification methods which are the speciality of the Separation Product Division.

On the whole, the three largest divisions - Separation Products, Diagnostics and Pharmaceuticals - are considered in 1982 to be strongly technologically interdependent, forming a unit with a common base of biotechnical knowledge. Important links between the three business areas are fields within the new biotechnology, complementing the historical links and background in the dextran research. The *pharmaceutical/health care business* remains the largest and single most important with ophthalmology and the eye surgery product Healon emerging as a strong separate business and expansion area. Through an acquisition of a Dutch firm - Medical Workshop - in 1982, Pharmacia's pharmaceutical group extends its ophthalmological base, including also eye lenses in the product range. The special mode of marketing these products directly to eye surgeons

⁶Annual Report 1981, p.6

⁷Ibid, p.6-7

motivates a separation of the ophthalmology operations from the rest of the pharmaceutical activities.

Pharmacia's foundation in infusion product technology is extended through an acquisition in 1986 of Deltec Systems Inc., widening the range of ambulatory drug delivery pumps and related products.

Research and development, and production within the pharmaceutical division is successively shifted away from traditional synthetic chemicals with general end user effects toward biologically based compounds or preparations with other, specific modes of action. During the second half of the 80s, mergers and acquisitions connected to the overall, restructuring of the Swedish pharmaceutical industry - the merger with Kabi in 1989 - link Pharmacia's traditional pharmaceutical technologies to a number of additional areas with different underlying technologies; oncology (cancer treatments), smoking cessation, nutrition solutions, anaesthesia, peptide hormones (growth hormone treatment), central nervous system pharmaceuticals, self care treatments, pain relief pharmaceuticals and gynaecology/urology.

In the area of *diagnostics*, organizational changes due to mergers and acquisitions result in a number of internal transfers of the business area within the corporation. The market for the products - i.e. hospitals, clinical laboratories and other health care institutions - relates diagnostics to the pharmaceutical area. However, the technological links to the separation product area also remain. Within the product range are automated laboratory systems for allergy diagnostics, with technological, user links to biotech separation and purification instruments. While the 80s is partly devoted to technological diversification and business expansion of the diagnostics operations, the period 1986-93 becomes mainly devoted to a concentration of the business, successively returning to the allergy diagnostics area. Among the new product areas that are incorporated 1980-86 through acquisitions are immunodiagnostic systems and diagnostic blood virus products.

Also within the *separation product area* organizational changes result in new techniques and new technologies being added. Through acquisitions in 1982 (P-L Biochemicals) and 1986 (LKB Produkter), the division's product ranges in chemicals and in instruments are extended. In the early 90s, after several years of R&D and large investments, a new generation of laboratory instruments - biosensors - and additional products for advanced research laboratories are launched. A new separate division, Biosensor, is formed around the new technology.

Around many of the new, added technologies, including those incorporated through acquisitions, a high degree of organizational uncertainty remains between 1986 and 1993. Problems and concerns whether to keep, integrate and develop, or divest and sell off come to characterize the view of these new technologies, resulting in a number of successive inter- and intraorganizational changes.

The fourth business area, covering *consumer products* manufactured by the company, and products imported and marketed in the Nordic countries by agents, also changes in the 80s as a result of reorganizations.⁸

New directions of change: expansion through acquisitions, mergers and alliances

A continual stream of intra- and interorganizational changes redirect the Pharmacia Group between 1980 and 1995. Alliances and various cooperation ventures are not new to the corporation in the beginning of the 80s, nor are radical intraorganizational adaptations. However, the frequency and magnitude of the intra- and interorganizational alterations affecting the corporation become, in many respects, exceptional and stand out as characteristic for this period. The main experiences have been built up in the areas of R&D, cooperation ventures for clinical tests of new pharmaceuticals, licensing agreements in export countries, and only to a minor extent in cooperative marketing ventures for specific products.⁹

Pharmacia's local R&D relations with organizations in the Uppsala region are developed already before the relocation of the company in 1950. After the move from Stockholm, stable exchange relationships with a number of local organizations successively form the foundation for Pharmacia's R&D activities, and shape also what internally comes to be

⁸One of the three agency firms, Consiva, is sold in 1983 and two remain within the corporation, Meda and Famaco. The same year, the consumer product division sells its 50 percent share in the post order firm Fleur de Santé. In a reorganization in 1984, consumer products like skin lotions are tied closer to the pharmaceutical production of wound care and skin diseases (dermatology), forming a separate Dermatology and Tissue Repair Division as part of the Health Care group. In 1986, in connection with the many inter- and intraorganizational changes in the company, the second agent, Famaco, is sold, including the production of consumer dry skin products. In 1987, and due to the acquisition of LKB, the third agent company, Meda, loses its right to represent the separation product division for sales in the Nordic countries. Meda remains a separate business enterprise within the Pharmacia Corporation and extends its deals with European manufacturers of pharmaceuticals, biotech supplies and health care equipment for sales in the Nordic countries. In 1991, a year after the incorporation of Pharmacia in the Procordia Group, Pharmacia reduces its shareholding in Meda from 100 percent to 19,7 percent. While Pharmacia's direct engagement in the consumer product area gradually decreases after 1985, the company becomes indirectly linked to consumer products in the Procordia deal in 1989. Beside the Health Care Business - including the biotech business operations - the newly formed Procordia Group comprises in 1991 a whole range of diversified, consumer business units. In 1993, Procordia separates its portfolio of companies in two groups, one for consumer goods, Branded Consumer Products AB, and one for pharmaceuticals and biotech products, Procordia AB.

⁹For example, in 1961 a first preliminary agreement is signed with the Swedish pharmaceutical company Astra for joint sales and distribution in certain export markets. During the same period, the company signs agreements with Kjellbergs, Green Cross Corporation and Seikkagakku K.K. for the sales of the company's products in Japan. In the same way, cooperative marketing and distribution ventures with the Swedish manufacturer Vitrum in the 60s and 70s, for the sales of Vitrum's products in North America by Pharmacia, are all minor steps in the process of joining marketing resources with other firms.

described as the apparent "academic organization culture" of the company. In the 60s and 70s, the company's R&D activities and contacts are spread also to other regions: to USA through collaboration with the La Jolla Cancer Research Foundation in California and also to Japan. Within the local Uppsala network, Pharmacia is linked to the University Hospital, to governmental agencies situated in the region.¹⁰ In addition, international contacts in the field of basic research are intensified in the beginning of the 80s. Complementing the relationship with the La Jolla Research Foundation, Pharmacia develops intense R&D relationships with a number of academic institutions.¹¹ Joint R&D ventures with organizations in Europe, Japan and North America become one of the first and most important driving force for Pharmacia's internationalization.¹²

All the four principal business groups, the pharmaceutical, diagnostics, consumer product and biotech product units engage in externally oriented events.¹³ The long tradition of establishing R&D ventures, of engaging in marketing and distribution alliances abroad, and of agency contracts with foreign suppliers to the Nordic market continues. While each major external change in most cases involves only one of the four core business divisions at a time, both direct and indirect effects on one or several other divisions often appear as a consequence of the needs for formal reorganizations and internal adaptations of the corporate structure.

In terms of the scope of the changes taking place, 1982 and 1986 come to stand out as two important and exceptional years. Integration processes resulting from the acquisitions in 1986 affect concurrently all the three main business areas: pharmaceuticals, diagnostics and separation products. In the period 1986-93, Pharmacia's organization and operations are shaped by the significant efforts put down into restructuring the new, emerging multinational corporation. These efforts come to encompass the concurrent processes of reorganizing the central divisions in Uppsala and elsewhere, the structuring of the production operations in Sweden, other parts of Europe and USA, the divestment and sales of business areas, the reorganization of the international net of marketing subsidiaries, the organization of R&D contacts and internal units, and the development of new intraorganizational relations and control systems.

¹⁰E.g. Statens Veterinärmedicinska anstalt, Livsmedelsverket, Socialstyrelsens Läkemedelsavdelning, the University's Biomedical Center, Lantbruksuniversitetet, the Wallenberg Laboratory, and Bionova(joint cooperative business venture).

¹¹E.g. University of California San Diego, Columbia University (New York), University of Manitoba (Winnipeg), Long Island University, Centre of Disease Control (Atlanta), Bradford University (UK), University of Oxford (UK), Swedish Universities in Umeå, Lund, Linköping and Örebro (Sweden), Karolinska Institutet (Stockholm), Tumour Laboratory (Tokyo), Tokyo Women Hospital University, and Monash University (Australia).

¹²One of the driving forces for the many ventures are the new stock issues in 1981 in both Sweden and in the USA, later also in Japan, which improve the company's financial position.

¹³See Appendix

The external changes result in successive changes in Pharmacia's roles and positions in relation to end users, intermediaries and suppliers. The crystallization into four product divisions during the 70s results in a number of new roles and positions. In the 80s, the process continues, now within each of the four division and much as a result of the many acquisitions, mergers and alliances during the period. In the shadow of the differentiation process of the dominating pharmaceutical division - which leads the unit into contacts with new user groups - the growing biotech division also establishes new contacts. Pharmaceutical companies are among the first to begin to use up-scaled versions of chromatographic instruments, adding a number of new end users to Pharmacia's list of academic, laboratory customers.

Coupled with these changes, the biotech division also has to establish a more business like, buyer-seller relationship with the pharmaceutical and diagnostics divisions within Pharmacia. Successively, new internal routines, e.g. new accounting policies, are introduced. It also means that the latter two now more openly begin to approach other suppliers of both laboratory scale and process scale products.

As regards supplier contacts with the production units, the complexity of the biotech products - encompassing mechanics, electronics, biochemistry and optics based components - contributes to create a more diverse set of supplier contacts in the 80s. Despite the fact that separation systems entail a number of diverse components - computerized parts including both software and different hardware units, glass columns, fraction collectors, pumps, and more, and often require special application services - the separation product division has developed since the beginning a strong tradition based on a low degree of outsourcing. Suppliers are during the 80s to a very large extent delivering raw materials and standard components to the division's instrument production in Umeå and chemical production in Uppsala. When Pharmacia acquires and merges with LKB Produkter in 1986 the differences between the two companies are manifested. In line with LKB's historical background in instrument production the company has in the late 70s and early 80s taken the first steps towards the use of lego suppliers, reducing the internal control of certain production activities. The merger between the two companies after 1986 becomes an important trigger and starting point for restructuring the supplier contacts.

Organizational changes 1975-80: adaptations to rapid sales growth

Intertwined with Pharmacia's externally oriented changes, a continual stream of internal, organizational changes evolve. The official organizational structures presented 1974-80 indicate stability. The divisional companies are organized according to Pharmacia's main activities: Pharmacia AB (pharmaceuticals), Pharmacia Diagnostics AB and Pharmacia

Fine Chemicals (separation products). The formal organizational changes that take place during the years that follow, are relatively few. In the beginning of 1980, the official organizational division of the activities is basically the same. However, behind the official organizational chart are hidden changes connected to the stable growth of the corporation during the period.

The international net of marketing organizations changes as new subsidiaries are added in Switzerland, Austria and Brazil. The Benelux organization is reorganized in a Dutch and a 50 percent owned Belgian subsidiary. In the Nordic countries, Meda, which has been the official sales channel for most of Pharmacia's products, transfer sales activities to new subsidiaries. The organizational changes in the international organization are mainly internal adaptations to the crystallization into three distinct business operations, excluding the consumer goods activities. Sales growth remains stable and rapid, requiring continuous investments in marketing resources and larger, local organizations.

In a similar fashion, the organizational changes in the mother company between 1975 and 1980 are adaptations to the rapid investments in administration, production, R&D and distribution premises for the pharmaceutical, diagnostics and separation product organizations. The investments in large, and separate, premises for each of the three operations at different sites in the Uppsala region further stabilizes the ongoing organizational separation of the three business areas. The rapid sales increase and the expansion of R&D activities are paralleled with an equally rapid expansion of the production organization, the majority of which becomes concentrated to the Uppsala region. For example, apart from a new Diagnostics Center, the Separation Product Division starts the operation of a new chemical plant in Uppsala and the division invests in a completely new office building, separated from other divisions of the central mother organization.

The corporation's investments in new plants, land and machines rise from 88 MSEK in 1978 to 143 MSEK in 1979 (85 percent in Sweden). In the beginning of 1980, the Diagnostics Division concludes Stage II and moves into a new head office. Stage III starts, including a production plant and an additional R&D laboratory. The Pharmaceutical Division opens up a new plant for infusion products. In addition, a new venture, BioCell Laboratories (50 percent owned by Pharmacia), with a combined R&D and production plant is established in 1980. Despite the fact that now almost 90 percent of total sales are outside the home market, 88 percent of Pharmacia's investments are concentrated to Sweden and the Uppsala region.

Organizational changes 1980-85: continued growth and restructuring of business areas

The organizational changes that take place 1980-85 lay the foundation for the big changes which will start in 1986, following a number of company acquisitions. Organizational alterations come to reflect the restructuring of the four main business areas in relation to each other. In some cases, the resources for some marketing and production activities still overlap. On a corporate, managerial level, the links between the different areas are still strong. Concurrently, technologies, user situations, buyers and end-users, are becoming more and more differentiated, motivating an increased organizational differentiation between the four business areas. In addition, within each business area, organizational growth increases and technological changes continue, motivating reorganizations of the internal divisional structures.

In 1980, as a result of a reorganization in which the consumer product activities (the Medisan unit) of the Pharmaceutical Division are separated and divisionalized, Pharmacia is divided into four business areas: the Pharmaceutical Division, the Diagnostics Division, the Separation Product Division and Medisan.

The Separation Product Division has by tradition divided the unit by products and technologies. Chromatography equipment, electrophoresis instruments and the chemical production have been the dominant basis for organization. However, 1980 is the first year that the rapidly growing segment of industrial customers motivates the formation of a specific Industrial Applications Group, with customers mainly among pharmaceutical companies. The biggest unit is still formed around separation products on a laboratory scale, while the emerging technological area of cell biology (BioCell Laboratories) is in an early development stage, but still motivates a third sub-group group within the Separation Product Division.

The Pharmaceutical Division thus establishes its own sales organization in Belgium, the Netherlands and Austria, where Pharmacia already has subsidiaries. An important driving force behind the reorganization and specialization of marketing resources is the success of the newly launched eye operation product Healon. The process of separating the marketing units for pharmaceuticals from diagnostics and separation products gains speed. The Pharmaceutical Division has developed a tradition to cooperate with local companies for marketing of new products. This has been less common in the Diagnostics Division and is at the time an uncommon marketing strategy for the Separation Product Division.

In 1982-83, processes of integrating external units in the Pharmacia organization, P-L Biochemicals in USA for example, start. From an overall corporate perspective the year marks an important organizational change; the first significant steps to create a multinational corporation are taken. Production and R&D resources are spread internationally, reducing somewhat the dominance of the Uppsala organization. Internally, the organizational division into three main, distinct business areas is strengthened, but officially a "multi-purpose-competence" strategy is presented. Pharmacia management tries to stimulate technological cross-fertilization.

In 1984, Pharmacia accomplishes one of the biggest internal reorganizations between 1980 and 1985. In the strategic redirections of the Pharmaceutical Division in 1981, operations have moved away from traditional synthetic chemicals toward biologically based compounds in specialized areas. The aim in 1984 is to continue the decentralization and specialization of the marketing organization, based on a clear division of business areas. At the same time, it is officially acknowledged that there remain strong links between the Pharmaceutical and the Diagnostics Divisions, both through customer groups and through the dependency on biology, biochemistry and immunology. The purpose is to structure the business areas according to the new specialized customer groups, while on a central organizational level grouping activities with obvious biotechnological links. The result of the process is an organization formally divided in two Groups: The Pharmaceutical&Diagnostics Group and the Biotechnical Group.¹⁴ In 1984, the new Biotechnical Group executes another internal reorganization which results in the formation of three Divisions with totally six business areas.(Figure 6.1)¹⁵

The new strategy to spin-off new, biotech R&D ventures emerge as a consequence of internal tensions - as perceived by the biotechnology group - between the latter group on one side and the diagnostics and pharmaceutical groups on the other:¹⁶

We in the biotech division had the internal pressure to develop products, methods and techniques. We were considered by the other divisions to be very competent and well-informed about the

¹⁴Including the former Separation Division, the newly acquired American firm P-L Biochemicals and the formal responsibility for the two new, organizationally uncoupled, R&D ventures, BioCell and Bionova.

¹⁵The division for laboratory separation products (with two thirds of the Group's revenues) creates a new business area around the new high speed separation system FPLC. Traditional products are grouped within a separate business area. Central Business Development becomes the third separate business area. For the growing market of separation products on an industrial scale, the Process Separation Division is created with three central business areas for process service, process technology and process development. Up-scaled versions of FPLC are on the way to be launched, but chemicals dominate the product range of the new organizational division. The third division, Molecular Biology Division, is established for handling the growing segment of laboratories using chemicals and equipment within molecular biology. An important task for the new Division is to coordinate R&D, production and distribution contacts in the molecular biology area performed by P-L Biochemicals in USA and minor organizational units in Umeå and Uppsala. A completely new R&D venture in the new area of analysis technology - biosensors - is started in 1984 and complements the two established, separate ventures BioCell and Bionova in Uppsala.

¹⁶Interview, Spring 1994, former Biotechnology Group manager

development in biotechnology. That is why in the early 1980s we began to spin-off new R&D ventures like BioCell and Bionova, and to some extent also Biosensor. We had to detach these multi-purpose ventures from our daily, established development, production and marketing operations. These separate ventures were financed by all divisions, they were able to work undisturbed, and they did not interfere with the biotech division's regular activities.

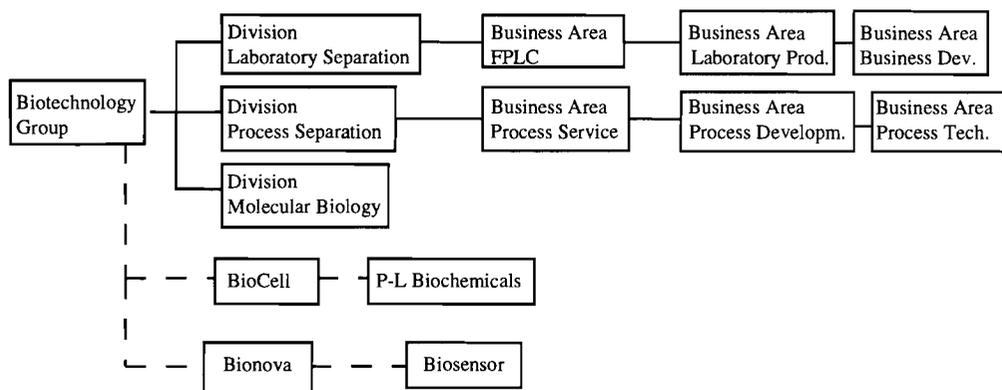


Figure 6.1. Organization of the new Biotechnology Group 1984

The rapid sales growth in many product areas results also in changes in the international marketing organization. A new subsidiary is established in Italy, mainly focused on the sales of allergy products and pharmaceuticals. Sales offices in more distant regions, Mexico, Middle East (Cairo) and Moscow, are also opened. The rapid growth in specific product areas results in a rapidly expanding sales organization.¹⁷ When Pharmacia reaches the mid 80s, the intensity of the corporate reorganization processes remains. When the new Spanish subsidiary has been established, the number of subsidiaries is temporarily stabilized. However, the speed in the number of acquisitions, mergers and alliances accelerates, with 1986 as an exceptional year.

Organizational changes 1985-93: integration of external organizations and disintegration of internal business units

The company acquisitions by Pharmacia in 1986 - AB Leo, LKB, Intermedics Intraocular Inc. and Deltec Systems Inc. - and other externally oriented actions (including the sales of Famaco), attract much attention in the company. In one year, the Pharmacia Corporation grows by 50 percent. Integration and consolidation become important organizational priorities. The following year, in 1987, significant efforts are made to integrate the new business units: Leo in the Pharmaceutical and Diagnostics Groups, Intermedics in the Ophthalmology Group, and LKB including Wallac and Biochrom in both the

¹⁷The success of Healon in USA leads to an increase from 2 to 50 sales representatives for ophthalmology products, in one year. The successes for new infusion products and for Pharmacia's sales of Kabi's growth hormone also affect the growth of the American sales organization. In 1985, due to acquisitions and growth, the US market accounts for nearly 40 percent of Pharmacia's sales. Parallel to the reorganization into business areas, the American organization has to coordinate and organize an emerging group of eight subsidiaries: four production companies, two allergy centers, one development company and a recently established research center. They are all grouped around Pharmacia's central US company, Pharmacia Inc.

Biotechnology Group and the Diagnostics Group. In addition, Deltec, manufacturing pumps and infusion instruments, is to be integrated with Pharmacia Nutech in a new unit, Pharmacia Deltec, under the control of the Pharmaceutical Group. A number of cooperation agreements are to be organized; e.g. with ENI (diagnostics instruments) in USA and with Alfa-Laval (in the Biolink joint venture for biotech process installations) in Sweden. Problems in the handling of all these processes appear almost immediately. In the LKB case, integration and coordination problems exceed those experienced by the Pharmaceutical Group, which are integrating AB Leo and other units.

The process of integrating Leo starts first and requires much time and resources 1986-1987. In order to increase efficiency in the process, functional managers for R&D, production and market activities are given the responsibility for the organizational integration of each specific operation. In the organizational integration of Leo, a large number of product areas and R&D projects have to be coordinated, based on a new corporate strategy and concentration of business operations. A tentative decision to divide the pharmaceutical products and projects into established, strategic, and explorative areas, including also divestment areas, guides the process. The integration of Leo's and the Pharmaceutical Group's marketing systems is, at the end of 1987, resulting in new, integrated pharmaceutical groups in Belgium, Holland, Norway, Switzerland and Austria. In Germany, a new, independent pharmaceutical subsidiary is created: Pharmacia Arzneimittel GmbH. In Sweden, the integration and rationalization of the many pharmaceutical production units takes longer.

In the case of LKB, the circumstances during which the integration takes place are different; the two companies encounter a number of difficulties and the organization of the integration process deviates considerably from the initial plans. (See Chapter 5)

The organizational integration processes affect the whole corporation. In the R&D units, development activities in all business areas are affected. A large number of ongoing research projects in the acquired companies are added to Pharmacia's, including also the specific, cooperation R&D ventures signed in 1986-87. Simultaneously, in a more distant part of the organization, a completely new research organization is created in LaJolla in California, USA.¹⁸

In 1988, the division into four major operations remains. Behind the formal organization, the intraorganizational activities within each Group are still affected by the ongoing

¹⁸Pharmacia eventually decides to take a step into the area of genetic engineering in order to be able to provide the pharmaceutical and diagnostics divisions with input from this important area, formerly handled through non-formalized contacts with external organizations.

integration processes. The Biotechnology Group continues to handle problems of integrating LKB, and the Pharmaceutical Group continues the processes of concentrating the activities into a number of specialized business areas, from the diversified business structure that has resulted from the acquisitions in 1986. The work to create functioning intra-Group routines continues. Secondly, due to the decreasing sales growth and the unexpected reduction in investments in the biotechnology field in general, many biotech companies, like Pharmacia, initiate radical organizational rationalization programs. A number of organizational changes affecting the whole corporation are steps in rationalization programs with the aim to reduce resource and capital expenditures. As a consequence of the projects initiated in 1989, new operational structures are established. Major organizational change can be anticipated towards the end of the year, as Procordia's planned acquisition of Volvos shares in Pharmacia and in Volvo's food corporation Provendora are announced. The many inter- and intraorganizational processes resulting from this deal are to be initiated the following year...

The formation of strategic alliances during the following, turbulent years 1989-93, these are mainly performed by the new pharmaceutical giant, Kabi-Pharmacia. The new Biosystems Group is busy forming a new organizational and operational structure in a period of reduced sales and accelerating needs for rationalization, cost reductions and re-organizations of production and marketing units. In 1992, one of the major restructuring activities by the new, specialized Pharmacia Biotech group is the sale of the former LKB company Wallac to the US based group EG&G Inc. Pharmacia Biotech also acquires the small Norwegian, R&D based company Dynachrome.

In 1992, Procordia acquires shares and becomes the biggest shareholder of the Italian pharmaceutical company Pierrel. In March 1993, the next big acquisition is announced; Procordia buys the large Italian FICE group consisting of Farmitalia Carlo Erba in Italy and Erbamont Inc. in USA, including subsidiaries. Kabi Pharmacia enters the next step in the restructuring of the Swedish pharmaceutical industry, now entering a fusion with a foreign pharmaceutical giant - Italy's leading pharmaceutical group. After 1993, the new corporate group resumes the old name Pharmacia, but now denoting quite a different organization compared to the one established in the pharmacy Apoteket Elgen in 1911.

In August 1995, Pharmacia and the American pharmaceutical company Upjohn announce that they intend to merge and create a new global, pharmaceutical giant, one of the ten largest in the world.

Epilogue

THE POWER OF THE SLOW FLOW

Behind many of the outbursts of organizational events pushing the Pharmacia Biotech organization onto new paths of change, there are also the long-lasting, slow movements of change. Around the technological innovation gel filtration an organizational context emerges from 1959. The period up to 1992 can, in one sense, be seen as a long-term, slow-moving spin-off process - spinning off Pharmacia Biotech from Pharmacia - coupled to a chain of events, breaks, ruptures and radical organizational breaches which sometimes create momentum in the spin-off, sometimes push the long-term process in the opposite direction, as in the creation of Pharmacia Biosystems.

The power of these hardly visible long-term slow flows of change can also be seen in the technological changes of the emerging company. It is not an easy task to define where the new technological "stories" begin and where the old "stories" end, or discern whether the change might in fact describe the middle of a completely different "story". When, in the history of the company, does it become a "biotech supplier"? The many name changes of the group of individuals, the department, the product division, the company, and the company group which subsequently result in Pharmacia Biotech tell us something about the technological shift. However, the major, important technological shifts can also be seen as the result of the power of the very slow flows of organizational and technological change. When, in the late 1970s, the product division/company begins to define itself as positioned in the midst of the global biotechnology network, the technological shift is the result of an "invisible" long-term technological shift. From the base in separation and purification products, slow and cumulative changes in its customers' scientific orientations, and in the company's own product development orientation, the company transcends into a "biotech" company, positioned in "the new biology" and "the new biotechnology".

The same type of slow moving, stable process of technological change seems to lead the company into molecular diagnostics in the early 90s. Pharmacia Biotech becomes part of the movements in the global biotech- and pharmaceutical/health care industrial complex. With the advances in the many scientific areas underlying the new biotechnology as foundation, many of the product development activities and technologies move towards diagnostics.

These slow flows of change encompass a number of concurrent, interdependent processes. When Pharmacia Biotech emerges as company, the Pharmacia Corporation is part of the long-term structuring and concentration of the Swedish pharmaceutical industry and the steps into the international arena. Every "story" or process contains parts of all other "stories" which emerge concurrently. The many short- and long-term efforts to redirect the company's marketing and distribution activities are important parts of these interdependent processes. In fact, in the 1990s, marketing and distribution change processes became central in the development of Pharmacia Biotech.

THE DRAMA OF GREAT EVENTS

The story of Pharmacia Biotech's emergence as a company is filled with the drama of great events: organizational breaks, peaks of change when new structures are created, and radical steps onto new paths of change. In some respects, these peaks of change are delusive; they hide the long-term, non-visible roads of technological and organizational change putting in the forefront those exciting, captivating moments of explosive change. Nevertheless, these events have been important in the history of the company. They have upset old structures and norms, every time pushing the organization and its operations onto slightly modified routes of change. In some cases, the peaks of change have had partial effects on Pharmacia Biotech and its intra- and inter-organizational contacts. Other events have had much wider effects.

Thus, from a narrow distribution perspective, and disregarding for the moment the long-term stable processes of change, the history of Pharmacia Biotech can be narrowed down to a history of events. During certain periods of time, important events have pushed the emerging company's distribution operations in new directions. In the late 1960s and early 70s, when the first, integrated chromatographic instruments are launched, the need for after sales service and repair support - and thus the need for reversed product flows back to the subsidiaries and Uppsala and for new stocking facilities and routines - is a minor event, which directs the distribution operations onto a new road of change. In 1982, the

first major acquisition, of P-L Biochemicals, creates another peak of change in the distribution history of the company. The US based firm's very broad range of biochemicals with very specific characteristics - small amounts of fresh goods - represents another important break in which the company has to adapt to the fact that P-L's products are manufactured overseas and have very special transportation and storing requirements. The next major step, the merger with LKB Produkter AB, represents a break of a different kind. The merger of the two companies involves also the merger of the companies' distribution organizations and operations. Lastly, the major reorganization and introduction of direct distribution from 1989 and onwards, is directly coupled to the preceding merger event, and develops into one of the most apparent peaks of change in the distribution history of the company.

In a wider perspective, these distribution changes are part of other "event histories" in the organizational context. Thus, the merger of the distribution operations after 1986 is part of a much wider organizational change event, affecting almost every part of the biotech organization. Many of the most significant Pharmacia Biotech events throughout history, in turn, can be seen to be part of events on a higher level, i.e. initiated by the Pharmacia Corporation or actors in its moving context. In some cases, the peaks of change in Pharmacia Biotech have been controlled from below, by the biotech group. For instance, many of the changes of the 1960s and 70s, and the acquisition in the early 80s are mainly initiated and controlled by the biotech organization. The organizational breaks and events of the late 80s and early 90s are to a large extent forced on the company from above. The creation of Biosystems in the middle of 1990 is a direct effect of the deal between Volvo and Procordia six months earlier.

Irrespective of the origin of these "great events", the effects of most of them are difficult to classify as either "positive" or "negative" for the development of the company. Even the problematic merger between Pharmacia and LKB had its positive dimensions, at least in a longer time perspective. (A radical reduction of too broad product assortments in the two companies, a more rapid change of focus from product development towards distribution, marketing and internal organization matters, etc.) In the short term perspective, while being in the middle of this almost chaotic peak of change, most people in the organization would probably categorize the event and its predicted effects as negative. The drama of this and other great events is apparent while occurring.

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¹Listing here only the written sources which are cited in the case study text. (The sources are listed in consecutive order, as appearing in the text). In each chapter, a number of additional written sources and interviews have been used. (A typology of the written sources is described on p.339.)

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The written sources

To reconstruct the story of Pharmacia Biotech and Pharmacia (including LKB) in each chapter several additional written sources have been used. The most important belong to the following categories:

- Annual reports: Pharmacia/Procordia (up to 1995), Kabi (up to 1989) LKB Produkter AB (up to 1986), Pharmacia Biotech (Annual Reviews up to 1994).
- Official publications: Reports on and analyses of the Swedish and the global pharmaceutical and biotech sectors (e.g OECD reports, books, biotech industry data bases).
- Internal newsletters: Weekly/monthly internal news letters from LKB, Pharmacia, and Procordia 1958-1995. (E.g. "Sephadex News", "Phacta", "Phacta International", "Phocus", "Små Droppar", "Pharmacia News", "LKB Aktuell", "Oss Emellan", "LKB Information", "Interface", "Panorama International", "Dialog", "Separations", "Biotech-info", "Downstream", "Pharmacia Biosystems".
- Historical reviews: Reviews in books, annual reports and internal publications in connections with product or company jubilees. (E.g. "Nittonhundra elva nittonhundra åttiosex - Pharmacia sjuttiofem år")
- Strategy/marketing plans: Strategy and marketing plans 1975-1994.
- Protocols: Protocols from strategy and marketing planning meetings 1975-1994.
- Travel reports: Travel reports from task force group meetings with foreign market subsidiaries (mainly related to the after sales service change episode).
- Presentation material: Various forms of presentation material, analyses and protocols from conferences, HQ strategy meetings and task force planning meetings.
- Magazine and newspaper articles: Swedish and foreign business magazines (E.g. Financial Times Surveys; pharmaceutical and biotech industries).

Interviews

The study and story of Pharmacia Biotech's marketing change episodes 1989-1995 has been coloured by the contacts with a limited number of key interviewees and contact persons. The initial steps in these contacts were guided by semi-structured interviews, adapted to the special functions of the involved individuals, task force group and division, with focus on the After Sales Division. They concerned the intended change contents, the interaction processes and specific contexts in which the changes were to be implemented. During the course of the study, the collection of information in the more formal interviews, ranging in time between one and several hours, were complemented with other forms of direct contacts. In short, five types of direct contacts with people in Pharmacia Biotech successively generated new information:

1. Recurrent interviews and contacts with a select number of key interviewees:

Among these were several individuals in the task force groups of the focal marketing change episodes and in the management of the company. There were also key contacts providing the historical descriptions. During some periods, certain of these contacts became more of the nature of counterparts (rather than "respondents"), opening up the opportunity to successively clarify and comment on the questions and answers.

2. Single (or dual) interviews with focused contents:

Some of the interviewees were met only once or twice, and were adapted to the special function and position of the respondent. To this category belonged both interviews whose aim was to develop new knowledge about certain aspects of the marketing change episodes or history about the company, and interviews whose aim was to give chosen respondents an opportunity to comment on already emerging descriptions.

3. Participation in HQ divisional meetings and planning sessions:

During the first round of interviews, information was also collected during participation in task force meetings. These types of contacts were frequent during the first round of contacts with Pharmacia Biotech (Pharmacia LKB Biotechnology) in Uppsala 1990-1991. These types of group contacts and interactions started and remained most frequent with the new After Sales Service Division.

4. Participation in joint HQ planning meetings:

During 1991, participation in central planning meetings involving individuals from several HQ divisions (marketing, sales, after sales, product divisions) provided the opportunity to interact with and collect information about ongoing change processes. One joint internal meeting in 1991 concerned information to other divisions of planned changes in the technical service operations.

5. Participation in strategic marketing conferences:

The participation in larger strategic marketing conferences 1991-1995 which involved both central HQ personnel and marketing subsidiary managers provided the opportunity for observations, interactions and interviews (e.g the Copenhagen meeting/After Sales Division 1991 and the BioDirect meeting 1995). During seminars coming steps in the strategic marketing changes were presented and new plans were outlined. Apart from the direct contacts, the preparations for and the follow-up of these meetings also provided important written sources.

During the course of the study process, a number of key contacts were developed which provided an important continuity in the process. Some of these key contacts and other shorter interviews have left their mark on the descriptions more than others. Most of the more lasting and stable contacts, as well as the shorter interviews, have been important in that they have provided the links to various forms of secondary sources (providing internal protocols of ongoing change processes, historical archival material, travel reports, long and short term marketing plans, presentation material from internal meetings, complete collections of weekly/monthly internal LKB and Pharmacia newsletters, and more). Irrespective of number or time length of the interviews, the list below sums up some of the interviewees who have put their mark on different parts of the descriptions in these ways (including stable contacts and interviews down to two-three hours.)

<i>Contacts/interviewees</i>	<i>Major area of influence in case descriptions</i>
Arne Forsell	The overall case study 1989-1995, comments concerning the Volvo-Procordia deal and Pharmacia Biotech links to the Kabi-Pharmacia merger, the Biosystems venture 1989-1992, (and comments concerning confidential material.)
Per Idberg	The after sales service episode, Pharmacia Biotech background, the Biosystems venture.
Christer Ullin	The after sales service episode, the LKB-BTG merger.
Leif Jawerth	The after sales service episode, the LKB-BTG merger.
Seppo Nilsen	The after sales service episode.

- Arthur Cole The Biosystems venture, the regionalization change episode.
- Bengt Belfrage Review of case descriptions, period 1993-1995, incl BioDirect venture.
- Lasse Öberg Information concerning Pharmacia BioProcess, overall changes related to industrial customers 1990-93.
- Lars-Erik Utterman The regionalization change episode.
- Jan Ehrneberg The distribution and logistics change episode.
- Nils-Ingvar Ohlsson The emergence of Pharmacia Biotech 1959-1986.
- Jan-Christer Jansson The emergence of Pharmacia Biotech 1930-1970 including technological background.
- Per Sjöberg Central marketing support 1990-1993.
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- Leif Bergstedt The after sales service change episode.
- Lorentz Larsson Comments on nternational marketing and subsidiary contacts 1990-92.
- Rune Ohlinder LKB background, LKB-BTG merger process.
- Bo Malm Central marketing support and change of internal routines 1990-1993.
- Lars Kjellén The after sales service episode, the distribution and logistics change episode (subsidiary perspective)
- Peter Johnsson The after sales service episode, the distribution and logistics change episode (subsidiary perspective)

Appendices

1. Major Pharmacia alliances and acquisitions 1980-1990
2. List of major biotech suppliers emerging 1980-1995

APPENDIX 1. Major Pharmacia Alliances and Acquisitions 1980-1990¹

- (P)= Involving the Pharmaceutical Division
 (D)= Involving the Diagnostics Division
 (B)= Involving the Biotechnology Division
 (C)= Involving the Consumer Products Division

1980:

<u>Counterpart</u>	<u>Purpose</u>
Independent R&D groups (Sweden)	Joint investments in 1979 in Swedish research company BioCell in Uppsala formed to perform R&D in cell biology.
Simebio S.A. and Cerba S.A. (France)	Acquisitions of a commercial clinical test laboratories in France (D).
Schering AG (Belgium)	Agreement to let subsidiary of Schering AG distribute Debrisan in France.
Local supplier (USA)	Acquisition of supplier of allergenes for allergy product production in USA connected to Pharmacia's operations in wholly owned BHP Inc. (D).
Foreign licensors	A number of new agency contracts with foreign health care and pharmaceutical companies for distribution in the Nordic countries (P).

1981:

Kallestad Laboratories, Inc. (USA)	Licensing agreement concerning the sales of certain products in the allergy field (D).
Nyegaard & Co. A/S (Norway)	Extended cooperation in the allergy field. Project supported by the Norwegian-Swedish Industrial Development Fund (D).
C.E.A. (Commissariat à l'Energie Atomique) (France)	A cooperation agreement with the state owned company C.E.A. in the diagnostics field. As part of the cooperation, Pharmacia sells its majority shares in Simebio S.A. and Cerba S.A., two commercial clinical laboratory operations. Pharmacia remains minority share holder (D).
Cooper Laboratories (USA)	The operations of the Pharmacia subsidiary BHP, Inc. are sold to Cooper Laboratories. The company is bought in the 70's to ensure certain deliveries of raw materials (D).
Johnson & Johnson (USA)	An agreement is signed with the American company concerning the sale of Debrisan in the United States and Canada (P).
Schering AG (Belgium)	Extended the agreement with Schering by concluding an agreement for the sales of Debrisan in Belgium (P).
KabiVitrum (Sweden)	Agreement by which Pharmacia assumes exclusive distribution rights in the US and Canada for all the company's products (excluding nutrient solutions in the US.) (P).
Gambro (Sweden)	The Pharmaceutical Division of Pharmacia begins to develop certain products for dialysis. Pharmacia takes on the production of CCAPD solutions. Gambro will be responsible for marketing (P).
Knut Spaerens Laboratorier A/S (Norway)	Product development and production agreement in the infusion product area (P).
OY Star AB (Finland)	Cooperation agreement concluded. Oy Star takes over the marketing of Pharmacia's products in Finland, while Pharmacia retains product name and identity. Opens a channel to the Soviet market (P).

¹Collected mainly from Annual Reports 1980-1990. Mainly the start-up years are listed.

Fortia AB (Sweden)	Pharmacia starts a partially owned mail order operation (Fleur de Santé) with support from the mother company, Fortia AB (C).
Brocades-Belga S.A. (Belgium)	Acquisition of the remaining 50 percent of the shares of N.V. Pharmacia Belga S.A. from Brocades-Belga S.A. (P).
Green Cross Corporation (Japan)	Agreement to distribute Debrisan in Japan (D).
Foreign licensors	Pharmacia Norden signs a number of new licensing agreements (e.g. with Swiss firm Mundipharma) to market a number of new pharmaceutical products in the Nordic countries (P).
Foreign licensors	A number of new sales agreements are signed by Pharmacia's agency divisions (Meda, Famaco and Consiva) for sales in the Nordic countries. (E.g. with Nordmark-Werke, Kali-Chemie and Gist-Brocades), (P).
1982:	
Uppsala University and the National Board for Technical Swedish Development (STU) (Sweden)	Joint long-term R&D project in cell biology in Uppsala. A total of 36 Mkr is invested (B).
Nyegaard & Co. (Norway)	Extension of established R&D venture (allergy area) with Norwegian pharmaceutical company Nyegaard. New venture in the area of small peptides is started (P).
Nu Tech Medical Systems (USA)	Acquisition of the know-how and rights to the products of the American development company Nu Tech. Nu Tech's implantable catheter systems complement Pharmacia's product Spherex in the area of Infusion Products. The new name of the company is Pharmacia Nu Tech Inc. (P).
Vespa Inc. (USA)	Acquisition of Vespa which is integrated with Pharmacia's American mother company Pharmacia Inc. Vespa supplies raw material for vaccines in the insect allergy field (D).
Medical Workshop (Holland)	Acquisition of the Dutch and leading European manufacturer of implantable eye lenses and instruments for eye surgery. A step in strengthening the position in Ophthalmology (P).
P-L Biochemicals Inc. (USA)	Acquisition of P-L Biochemicals, a U.S. R&D and manufacturing company specialized in products for biochemical research, especially molecular biology. Manufactures e.g. fine chemicals for hybrid DNA research. A complement to Division Separation Products (B).
Kallestad Laboratories, Inc. (USA)	Extended licence agreement on the manufacturing and marketing of allergy products in the USA (D).
BioCell Laboratories HB (Sweden)	Acquisition of additional 33 percent of the shares in the jointly owned research center in Uppsala. Adds up to a total share of 83 percent (B).
Skåne Gripen AB (Sweden)	Sales of one of the three agency firms, Consiva, to Skåne Gripen. A step in the process of reducing the number of distantly related business areas (C).
Goedecke AG (Germany)	Marketing agreement to sell Debrisan in Germany (P).
Johnson & Johnson (USA)	R&D and marketing agreement signed in the area of wound treatment (P).
Local licensees (USA, Mexico, Germany, Australia)	As a consequence of the agreement with Gambro AB a number of new dextran-licensors for the manufacturing of dialysis solution are signed up (P).
Local licensees (USA, Benelux, Portugal)	Various licensing agreements with local companies for the sales of Pharmacia's dry skin consumer product HTH (C).
Gislaved Gummifabrik AB	Cooperation agreement to let Gislaved manufacture PV bags for dialysis products

(Sweden)	(P).
Local firms (USA)	Two allergy centers in New Jersey (51 percent ownership) and in Ohio (90 percent ownership) are established in order to be able to provide a complete system of products and services in the allergy area (D).
Oy Star AB (Finland)	Extended cooperation agreement in the area of ophthalmology and cancer treatment (P).
Local licensees (Australia, USA, Holland, Belgium, Portugal)	Licence agreements signed with local distributors for the marketing of the consumer products HTH and L300 (C).
1983:	
Sorigina (AB Cardo) (Sweden)	Acquisition of Sorigina's raw dextran production (P).
Forita AB (Sweden)	Pharmacia sells the 50 percent share in the new mail order firm Fleur de Santé to the mother company Fortia AB (C).
IMRÉ (USA)	Letter of intent signed with the US venture capital firm on R&D in the area of blood treatment (P).
University Hospital (Uppsala)	Extensive cooperation R&D agreement with Uppsala University Hospital (Sweden) is signed. Pharmacia invests money in new and extended R&D activities (P).
Local licensees (Italy, Switzerland, Finland, Australia)	Extended agreements with dextran licensees. The agreements concern cooperation in the area of infusion solutions (P).
Institut Pasteur & Pasteur Production (France)	Takeover by Pharmacia France of the marketing of Pasteur's program for allergy diagnosis and therapy. Discussions on an extended cooperation (D).
Miles Laboratories (USA)	The acquisition of Miles L. by German Bayer A.G. leads to termination of cooperation agreement between Miles and Pharmacia Meda on the sales of Miles' products in Scandinavia (P).
Meda Bang OY (Finland)	Takeover by Meda of the partly owned Finnish sales company (P).
Foreign licensors (Denmark, Switzerland)	New licence agreements with Danish and Swiss manufacturers on the sales of consumer related products are signed by Pharmacia Famaco (C).
Diephuis Beheer B.V. (Holland)	Acquisition of the Dutch producer of raw materials for R&D and production in the allergy field (D).
Minor, independent, research and venture capital firms (USA)	Pharmacia Development Company Inc. is established in USA and invests in a number of projects involving minor, independent research firms in pharmaceuticals, diagnostics and biotechnical areas (P, D, B).
1984:	
Biotechnology General Corp. (USA)	A cooperation agreement is concluded on joint utilization of bacterial production special acids for the infusion business (P).
International Institute for Microcirculation (USA)	Marketing agreement with Deltec on exclusive marketing of technically advanced pumps used in infusion therapy (P).
ACO Läkemedel AB (Sweden)	Manufacturing cooperation agreement in the area of sterile fluids for infusion therapy. Pharmacia acquires production resources in ACO's Gothenburg factory (P).
Memorial Sloan Kettering	R&D cooperation agreement signed for research in the cancer field (P).

(USA)

Remel Inc. (USA)	Cooperation agreement signed with Remel Inc. concerning the marketing of microbiological tests to laboratories in USA (D).
Sato Pharmaceuticals (Japan)	Contract signed with Sato for the marketing of the consumer product L300 (C).
Connogaught Laboratories (USA)	Cooperation agreement between Meda and Connogaught in the area of vaccines is signed (P).
Stena Diagnostics (Sweden)	Marketing cooperation in the Nordic market is established by Meda (P).

1985:

AB Volvo (Sweden)	Volvo takes over a large shareholding in the company and becomes the largest share holder.
Biomatrix Inc. (USA)	An R&D agreement is concluded, giving Pharmacia world marketing rights for certain aids for use in eye surgery (including minor shareholding) (P).
Verax Corporation (USA)	A development and marketing agreement is signed on the development of cell-culture systems (including minor shareholding) (B).
Deltec Inc. (USA)	Pharmacia increases its share holding in the company (P).
Chiron Corporation (USA)	R&D agreement on research on a particular type of human enzyme.(P)
Mölnlycke AB (Sweden)	Pharmacia sells the Nordic marketing rights for the consumer products HTH and HTH sunscreen, L300 and Caputan to Mölnlycke AB (C).
Electro-Nucleonics Inc. + Remel Inc. (USA)	Marketing agreement for the U.S. market to sell diagnostic test for throat infections (D).
Du Pont (USA)	Meda signs cooperation agreement covering acquisition of sales rights for Du Pont's pharmaceuticals in Scandinavia.
Chiron Corporation (USA)	Establishment of a 50/50 venture - Pharmacia/Chiron Partnership - to develop pharmaceuticals based on the substance hSOD for use e.g in connection with organ transplants (P).
Alfa-Laval AB (Sweden)	A joint venture - Biolink AB - is established. The new company is to be one of the first to develop and supply complete pilot and production systems for the expanding biotechnical industry. Plans are to let the new company distribute Chemap AG's products (B).
AB Leo (Sweden)	Acquisition of the Swedish pharmaceutical firm AB Leo. The acquisition marks an important step in the restructuring of the Swedish pharmaceutical industry (P).

1986:

Deltec Systems Inc. (USA)	Pharmacia acquires 83 percent of the shares in the medical technology firm Deltec. Parts of Pharmacia's business activities in the infusion area are merged with Deltec's business. Pharmacia Deltec Inc. is formed (P).
Electro-Nucleonics Inc. (USA)	Cooperation agreement is extended. Pharmacia acquires 20 percent of the shares. Joint research programs in the field of immuno-diagnostics are established. ENI takes over the rights to distribute a range of Pharmacia's diagnostic products in USA (D).
Intraocular Inc. (USA)	Pharmacia acquires Intermedics, an American manufacturer of intraocular lenses (P).
LKB-Produkter AB	Pharmacia acquires the Swedish company LKB, one of its main competitors in the

(Sweden)	biotechnical, separation product area, including the Finnish a company Wallac and the British company Biochrom (S, D).
Gambro AB and Crafoordska Stiftelsen	Pharmacia acquires a 33 percent share in the joint research venture Excorim KB in Lund. Among other things, the venture aims to produce protein products for the R&D on recombinant DNA in La Jolla, California (P).
External financiers (USA, Sweden)	Relationships with a number of external financors for the financing of new and extended R&D projects in Sweden and USA are established. External financing is acquired, e.g. for Pharmacia Sensor AB in Uppsala, a project to develop biosensor instruments (B).
Allergologiskt Laboratorium A/S (ALK)	Coordination of ALK's and Pharmacia's activities in the allergy therapy field. ALK acquires the rights for Pharmacia's product Pharmedin and the two companies
(Norway)	Vespa Laboratories in USA and Laboratorium Diephuis in Holland. R&D cooperation is complemented with marketing cooperation in certain regions: Sweden, Italy, Switzerland and Spain (D).
Cederroth Nordic AB (Sweden)	Sales of one of Pharmacia's agencies, Famaco AB to Cederroth (P).
Foreign licensors	Meda AB signs new licence contract with foreign suppliers, e.g. Fresenius A.G., Germany. Results in a disclosure of long term cooperation with Pfimmer in Germany (P).
1987:	
Concept Inc. (USA)	Agreement on product development and marketing of orthopaedic surgery products. R&D activities are to be performed within the newly formed company Pharmacia Orthopedics Inc. (P).
Alfa-Laval AB (Sweden)	Pharmacia's Process Separation Division cancels its engagement in the Biolink AB joint venture (B).
Advanced Tobacco Products Inc. (USA)	Agreement signed with ATPI on an acquisition of the company. Cooperation in the area of smoking cessation. The business is a complement to Leo's smoke cessation product Nicorette (P).
KabiVitrum AB (Sweden)	Agreement signed by which KabiVitrum takes over the rights for Pharmacia's infusion fluids, excluding the dextran products. KabiVitrum also acquires the licence rights for the dextran products in Scandinavia (P).
Virovahl S.A. and Syntello AB (Switzerland, Sweden)	Pharmacia acquires the rights to market HIV-tests world-wide, developed by Syntello in Sweden on behalf of Swiss Virovahl (D).
Cambridge Instruments Co. Plc. (UK)	Cambridge Instruments acquires Pharmacia-LKB's microtomy instruments for sectioning and slicing preparations prior to examination (B).
Assetor Kambium AB (Sweden)	Pharmacia sells its production unit for infusion products in Gothenburg to Assetor Kambium AB (P).
Stena Diagnostics (Sweden)	Acquisition of the Swedish R&D firm Stena, active in the field of monoclonal antibodies for cancer diagnostics and therapy results in the new company Pharmacia CanAg (P).
Gambro AB (Sweden)	Marketing cooperation agreement is signed with Gambro's Japanese subsidiary on the marketing of Pharmacia's Port-A-Cath injection port in Japan (P).
Local Distributors (USA)	Pharmacia Inc./USA takes over the distribution of Leo's cancer medicine Estracyt from local American distributors (P).
Knoll AG, Reckitt & Colman, Fresenius AG, Schneider-Shiley AG, B. Braun Melsungen (Germany)	New or extended distribution contracts signed by Media on the marketing of pharmaceutical and biotechnical products in the Nordic countries (P).

1988:

Electro-Nucleonics Inc. (USA)	Acquisition by Pharmacia of the former cooperation partner. Complementary R&D resources in the diagnostics area are acquired (D).
Local distributors	Pharmacia acquires the marketing rights for the cancer medicine Estracyt developed by Leo, but marketed by local firms. The marketing rights were acquired for sales in Great Britain, Denmark, Italy, France, Portugal, Spain and Australia (P).
Warner-Lambert (USA)	Cooperation agreement to develop and market Dekapinol, for plaque related diseases (P).
Chiron Corp. (USA)	Agreement signed by which Chiron agrees to take over the responsibility for the documentation and marketing of the substance HSOD (P).
Mölnlycke Toiletries and Cederroths AB (Sweden)	A major share of Pharmacia's consumer product range is sold to Mölnlycke and Cederroths (C).
Filtron Technology Corp. (USA)	Marketing agreement signed between the Process Separation Division and Filtron to market membrane products on the American market (B).
BioOrbit Oy (Finland)	Pharmacia-LKB's wholly owned diagnostics company in Finland sells its business in the luminescence area to BioOrbit (D).
Rhone-Poulenc Santé S.A. (France)	Rhone-Poulenc Santé acquires Pharmacia's 50 percent share in the former Leo ventures, Leo Rhodia HB (P).
Bristol-Myers (USA)	Licensing agreement signed on development of ophthalmology products (P).
Biomatrix Inc. (USA)	Extended distribution agreement with Biomatrix in the ophthalmology area (P).
Byk Gulden (Germany)	Marketing agreement signed with the German firm Byk Gulden on the sales of its products in Scandinavia through Pharmacia's marketing organization (P).
Farmos Diagnostica (USA)	Pharmacia acquires the rights to market one of the firm's product lines in Japan, Canada, Germany, Austria, France and Great Britain (D).
1988:	
Mallinck-Drodt GmbH, Knoll AG, Lipha, Kali-Chemie AG, Sanofi, Gist-Brocades N.V., Stafford- Miller Ltd., Fertin Laboratories A/S, AB Fenom, A.H. Robins Co. Ltd.	New or extended marketing agreements signed by Meda for marketing in the Nordic countries (P).
1989:	
Pharmacia Deltec Inc. (USA)	Pharmacia increases its share in Deltec to 100 percent (D).
Mundipharma Group (Switzerland)	Cooperation agreement concerning clinical tests, registration and marketing of the Group's pain relief products in the Nordic countries and Australia (P).
Dow Corning (USA)	Manufacturing and R&D agreement established in the urogenital field (P).
Ewos AB (Cultor AB) (Finland)	Pharmacia's majority share in Pherrovet AB, in the area of veterinary products are sold to the Finnish company Ewos AB (P).
European Molecular Biology Laboratory (Germany)	Pharmacia's Biotech Division launches its new DNA Sequencer, developed in cooperation with the Heidelberg laboratory (B).
Local distributors (Japan)	Pharmacia's Diagnostics Division takes over the complete responsibility for the distribution of all its diagnostics products in Japan. All former marketing agreements with local distributors are cancelled (D).

Karo Bio AB (Sweden)	Pharmacia sells its product range of test for bacteria diagnostics to Karo Bio AB (D).
Nordfonden and other local financors (Sweden)	Pharmacia takes a 20 percent share in a new diagnostics R&D venture, BVV Blood Virus Venture AB (D)
Dansac, Nicholas Laboratories Ascom Audiosys, Knoll AG	New or extended marketing contracts signed by Meda.
1990:	
Procordia and Provendora (Sweden)	One of the biggest mergers ever in Sweden between Procordia, Provendora and Pharmacia results in a new, giant industrial group in health care, food and services, Procordia. The merger results in a major restructuring of the Swedish pharmaceutical industry.

APPENDIX 2: Major biotech suppliers emerging 1980-1995²

1980-1993

Amicon Division (subsidiary of W R Grace & Co)

American company that becomes established as supplier in the 1980's (400 employees) and invests in facilities in US, UK and Ireland. Manufactures and sells separation and filtration systems for clinical and R&D laboratories as well as pilot and large scale processing systems for the pharmaceutical, biotechnology, beverage and chemical industries (chromatography and membrane filtration technology based). Supplies chromatographic media, columns and systems. The company does not develop any major alliances during the 1980's. In 1985, Amicon emerges as Pharmacia Biotech's main competitor in the area of separation media for industrial process separation, together with Swedish LKB Produkter and the US based Millipore Corporation.

Amersham International

British company that established a position in laboratory instrumentation and molecular biology reagents during the second half of the 1980's. Most important products are launched from 1985 and onwards. Of more than 2000 products for laboratory use, the majority are chemicals for research and diagnostics. Merges in 1993 with American reagent supplier for laboratories and industry, USB(United States Biochemical Corp., a privately held biotech company founded in 1973).

Applied Biosystems, Inc

American company which is founded in 1981 and has 1300 employees and subsidiaries in 9 countries in 1990. The company manufactures and supplies computer-controlled instruments and reagents for use in biochemistry, molecular biology, and biotechnology research and applications. In relation to Pharmacia Biotech the company emerges as a strong competitor in the molecular biology area, although more standardized products in electrophoresis and chromatography are also integrated in the product range. The acquisition of Spectros International's (UK) liquid chromatography division located in US in 1986 is one important step in extending the resources in this area. In 1989, ABI acquires the small Uppsala based niche producer (biopolymer mass analyzers) Bio-Ion Nordic AB. ABI strengthens the position in instruments and reagents for DNA synthesis in 1989 through a cooperative marketing venture with the American Cetus Corporation. During the 1980's the company develops a good reputation in after sales services and other support activities. In 1985, ABI is considered the main competitor to Pharmacia Biotech's molecular biology division in the area of gene machines. In 1993 ABI merges with another major instrument supplier, Percin-Elmer Cetus Instruments, creating a new global instrument supply organization. Percin-Elmer Cetus Instruments is a joint venture between Percin-Elmer and the American biotech R&D giant Cetus which was founded in 1971 and comes to belong to the most important R&D companies during the 1980s. In the 1990s Percin-Elmer acquires the licence rights for the new important PCR technique, which is expected to change instrumentation for molecular biology research.

Beckman Instruments, Inc

The American company is founded in 1935 as National Technical Laboratories and is renamed Beckman Instruments, Inc in 1950. The company begins biotech research in 1968 and merges with the firm SmithKline in 1982 to form Beckman. Beckman returns to independent status in 1989 as a result of the merger with the Beecham Group within which SmithKline Beecham had been established. In 1990 the corporation with 7300 employees (6300 in the US) has subsidiaries and affiliated organizations in more than 120 countries. The corporation develops, manufactures and markets systems and supplies for research and for clinical diagnostic laboratories. The corporation develops strong position in the chromatography and spectrophotometry areas, but remains active in a large number of additional areas. The company builds a reputation in reagents, test kits and other laboratory supplies.

Bio-Rad Laboratories, Inc

The American company is founded in 1957 and reaches a number of 2000 employees in 1990. The same year, the company has subsidiaries in 13 countries, including a European headquarter in Brussels. Bio-Rad and Pharmacia develop market leading positions in the area of protein electrophoresis during the latter half of the decade. Chromatography instruments and supplies are also sold. Like Pharmacia Biotech, Bio-Rad also develops a position in diagnostics. Among the company's 3500 products on the market in 1990, a

²Pharmacia Biotech, selected market analysis data, Uppsala, 1992

number are reagents, gels and columns. The company has no major ties with other supplying companies at the end of the 1980s.

Boehringer Mannheim GmbH

The German chemical-pharmaceutical giant emerges as an important competitor in molecular biology reagents in the 1980s. In the beginning of the 1990s it is generally considered the world leading supplier of molecular biology reagents for diagnostics. Manufactures and markets also bulk biochemicals for pharmaceutical and diagnostics industry and diagnostics instrumentation.

Hewlett-Packard

The corporation establishes an independent position in the biotech instrumentation area as American biotech giant Genentech is bought out of the joint partnership HP-Genenchem in 1987. The corporation begins to developing positions in both electrophoresis and chromatography. The mother organization's established position in computer technology supports the instrument business as the importance of integrated, computer based biotech instruments is accentuated at the end of the decade. The corporation has also an established, multinational marketing network.

Hitachi, Ltd

The multinational Japanese corporation develops analysis systems and software for biotechnology research in the 1980s. DNA sequencing instruments are included in the product range. In an agreement with LKB Instruments (in 1986 acquired by Pharmacia AB) in the beginning of the 1980s the former takes on the responsibility to distribute worldwide Hitachi's software program for DNA sequencing and analyzing.

Hoeffer Scientific Instruments

A US based firm that is established in 1967 and which develops a strong position in electrophoresis during the 1980's. In 1985 the relatively small company is considered a major competitor to Pharmacia Biotech in this area, together with Bio-Rad and LKB. Defends its position in electrophoresis during the latter half of the decade.

IBF SA(L'Industrie Biologique Francaise)

This French manufacturer of process scale chromatography and small scale separation instruments (LPLC and HPLC) for the bio/pharmaceutical field and for food applications starts US operations in 1987, IBF Biotechnics Inc. IBF together with Bio-Rad, LKB and TSK in Japan are considered one of Pharmacia Biotech's major competitors in the chromatography area in the middle of the 1980's. In the 1970's the company established a cooperative alliance in the chromatography area with LKB, an alliance which is strengthened in the beginning of the 1980's, before LKB's merger with Pharmacia Biotech. IBF had developed a strong position in separation gel production while LKB distributed the products worldwide.

Life Technologies

The American manufacturer of molecular biology reagents is formed in 1983 by merger of Bethesda Research Labs and Gibco Corp. The company's strategy to establish leadership in development of molecular biology research products is achieved in the 1990s. Together with German company Boehringer-Mannheim L T establishes a leading position in molecular biology media.

LKB Produkter AB

The second Swedish multinational biotech supplier. The company merges with Pharmacia Biotech in 1986. (Described in chapter xx, p.xx)

Millipore-(Waters) Corp.

The American firm Millipore Corp. is established in 1954 as Millipore Filter Co. In 1980, the company merges with Waters Associates, a US firm well established in the area of chromatography. The 5800 employees (1988) are employed at manufacturing sites and in marketing units worldwide. HPLC instruments and columns, water purification equipment and protein sequencing systems come to belong to the most important products. Millipore, together with the Japanese companies TOSOH Corp and Shimadzu emerge as Pharmacia Biotech's chief competitors in the area of high speed separation (i.e. competing with Pharmacia's FPLC system launched in the beginning of the 1980's).

Shimadzu

Japanese manufacturer in the high speed separation area (instruments) emerges as newcomer in the 1980s.

Sigma-Aldrich Corp

The US based company is formed in 1975 by the merger of Sigma International Ltd and Aldrich Chemical Co. The company develops a strong position in chemicals for biotech research e.g for genetic engineering.

TOSOH Corp(TosoHaas)

The Japanese company(former Toyo Soda Manufacturing Corp) emerges during the first half of the 1980s as one of the main competitors in the supply of chromatographic separation media and becomes the largest manufacturer of ready-packed columns for high-speed separation in the middle of the 1980's. The firm which was established in 1935 employs 5000 people in 1990. The company manufactures and markets separation systems, diagnostic reagents, gel columns among other products. A joint venture with American firm Rohm and Haas Co is formed in 1987 for the marketing of chromatographic instruments and process scale equipment, HPLC columns, chromatographic column packings and bioprocessing aids.

1995

In 1995, Pharmacia Biotech considers the following to be the main competitors in the three main business areas:³

<u>Process:</u>	BioSeptra (US), Amicon (US), Tosoh (Japan)
<u>Laboratory Systems:</u>	BioRad (US), Perkin Elmer/ABI (US), PerSeptive Biosystems (US, Hitachi (Japan), Shimadzu (Japan), Beckman (US), Waters (US), Hewlett-Packard (US)
<u>Reagents:</u>	Life Technologies (US), Boehringer Mannheim (DE), NBL (US), Takara (Japan), Amersham/USB (UK/US)

³Pharmacia Biotech, selected market analysis data, Uppsala, April 1995

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