Integration and Efficiency in Marketing Systems

By Lars-Gunnar Mattsson, ekon. lic.

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Lars Östman från värmen hälsar.

Integration and Efficiency in Marketing Systems

The Economic Research Institute

at the Stockholm School of Economics
Sveavägen 65,
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Preface

This report, carried out at the Economic Research Institute will shortly be submitted as a doctor's thesis at the Stockholm School of Economics. The author has been entirely free to conduct his research in his own ways as an expression of his own ideas.

The Institute is grateful for the financial support which has made this research possible.

Stockholm, March 1969

THE ECONOMIC RESEARCH INSTITUTE
AT THE STOCKHOLM SCHOOL OF ECONOMICS

KARL-ERIK WÄRNERYD
Director of the Institute

FOLKE KRISTENSSON
Program Director
Marketing Management — Strategy and Economic Structure

Foreword

Some knowledge of the personal background to this study may perhaps add to the reader's understanding of this report and of my frame of reference. I first became interested in the subject of integration in marketing systems early in the 1960's when I was working as a research assistant and consultant at the Swedish Wholesalers' Research Institute, where I came in contact with trends and ideas concerning structural rationalization in various branches of the retail and wholesale trades. My interest was confirmed during a one-year trip to the USA, where I studied marketing problems in particular from the wholesaler's point of view, and by work on an investigation of the structural and marketing problems of the bakery industry in Sweden. I have also had the advantage of many years' contact with the Marketing Section of the Federation of Swedish Industries which has given me some insight into current problem areas concerning relations between manufacturers and distributors. Moreover I have been able to follow developments in the Swedish consumers' co-operative movement, partly as a consequence of my family background.

Thus, long before I embarked on the present study, I had been in touch with and interested in the problems that are its subject. I have approached the subject as a business economist, with a special interest in marketing economics. Needless to say, had my special area of interest instead been, for example, organization theory or microeconomic theory, the study might have taken another form.

I have carried out this study in its entirety at the Economic Research Institute (EFI) at the Stockholm School of Economics, where I am attached to the research division headed by Professor Folke Kristensson. Without the many advantages of membership of the Institute—intellectual, practical and financial —this study could not have been carried out. I would like to thank in particular Professor Kristensson, who has followed the work from its initial stages, for his help and support in many forms and for his good advice and constructive criticism. I also extend my thanks to all my former and present colleagues at the research division for Marketing Management—Strategy and Economic Structure for their valuable positive criticism at our group meetings.

Preliminary versions of the manuscript have been read and commented upon by Professors Paulsson Frenckner, Dick Ramström, Karl-Erik Wärneryd and Messrs. Sture Berglund, Leif Borin and Bertil Kusoffsky. I have also had the benefit of discussions at various stages and concerning particular sections of the manuscript with Professors Albert Danielsson and Jan Odhnoff, Messrs. Lars Berg, Harry Nyström, John Skår and Jan Valdelin. I would like to ex-

press my gratitude to all of them for their suggestions and very helpful advice.

During the empirical study I encountered very helpful cooperation on all sides in the arrangement of interviews and the collection of other data. Unfortunately, for confidential reasons, I must in this case restrict myself to an anonymous expression of my heartfelt gratitude to all the persons concerned.

I would like to thank Messrs. Hans Näslund, Nils-Erik Wirsäll and my father, Gunnar Mattsson, for the most stimulating interest which they have shown in this study. As business practitioners with deep insights into the functioning of marketing systems, they have been of great help to me.

Mrs. Nancy Adler, B. A., has translated the report from the Swedish. In the course of the translation it has been possible to eliminate many ambiguities contained in the original text, and this has meant a considerable improvement in clarity. I am most grateful to Mrs. Adler for her help in this respect.

Mr. Leif Borin checked the survey of literature in chapter 7, Mr. Jan Valdelin drew up the subject index and Miss Ulla Hellström helped me with the list of references. I am very grateful for their assistance.

With the possible exception of the author, the person who has worked the hardest on this project is Mrs. Ingrid Ekenäs. Mrs. Ekenäs has typed out almost all the several versions of this lengthy report, working at all times untiringly and with great loyalty. I should also like to thank Mrs. Margaretha Keijser for her help in this respect.

I am glad to acknowledge the grants that have been received from the Svenska Handelsbanken's Foundation for Social Research and the Swedish Council for Social Science Research which have partly financed this project.

To my wife I want to express my deepest gratitude for her continual support and encouragement during the preparation of this report.

Stockholm, April 1969

LARS-GUNNAR MATTSSON

Contents

Chapter 1
Introduction and Preview of Contents

Background

The initiation of this study was inspired by certain very conspicuous changes in the marketing sector in Sweden during the last ten years or so. These changes have been labeled variously as "increased integration", "concentration", "group competition", "bloc formation", etc. One aspect of this development is that chain organizations, and different kinds of voluntary associations of independent retailers and wholesalers, dominate a rising proportion of the market in many sectors.[2]

There has also been a tendency to centralize the making and implementation of marketing decisions in such firms and groups, so that the behavior of different units in a system becomes more uniform and, in various ways, to change the behavior of the units with a view to achieving higher efficiency in the system as a whole. Some examples of this development in the daily goods sector are: the formation of regional associations in the consumers' cooperative movement, the reorganization of the retailers' cooperation (ICA) as a nationwide voluntary chain, various means of cooperation within the wholesaler-sponsored voluntary chains and the increasing influence of wholesale firms on capital acquisition and the establishment of new stores.[3]

There has naturally been a growing interest in, and awareness of, the effects of all these changes on behavior and efficiency in marketing systems, and in the effects on the marketing activities of the manufacturers. Here is a sample of some pertinent questions: How do changes in the centralization of marketing decisions in a system affect the efficiency of the system? Can independent retailers and wholesalers, who have not entered into any formal cooperative agreements, achieve the same efficiency as formally organized groups? What kind of program should a voluntary chain adopt, and how shall the members of the group be selected? What kind of relationship, if any, exists between integration, in the various senses attached to this term, and the efficiency of the system? How is the manufacturer's position in the marketing channel affected, and how can he adjust his marketing policy to the various changes in the relations between the wholesale and retail units through which he reaches

[1] Various terms used in this chapter, such as integration, system, control, efficiency, etc. will be defined later in the report. They are used here in their everyday meaning.

[2] Support for this statement can be found in, for instance, the Swedish government report on concentration in industry and trade (SOU, 1968, ch. 6).

[3] Many examples of this type in several merchandise sectors are quoted in SOU (1968, chs. 6—8 and appendix 7: 1).

the consumers? From society's point of view, what are the effects on pricing, innovation, use of resources, etc.? These and similar questions stimulated me to undertake this study, though not with any purpose of answering them as I have formulated them here.

Also in the background has been my belief in the advantages of a system-oriented approach to the study of many marketing problems. Taking an admittedly very broad and generalized view of marketing literature, we can say that it falls into two main categories. The first of these includes the study of the functions, structure, behavior and efficiency of various marketing institutions, mainly the wholesale and retail trades but also of the marketing system of a particular trade, area or country. The second broad category consists of studies of the marketing policy of the firm (usually the manufacturing firm). Decisions regarding the various means of competition provide the main subject. The focus of interest is the single firm, *the* decision making unit, and its relations to the environment.

The two categories are to some extent connected. For instance, when marketing channel decisions are discussed, reference is often made to general changes in the structure etc. of the distributive trades. On the other hand, when these changes are themselves the subject of analysis, the marketing policies of the firms in these trades are often referred to. However, relatively little attention has been paid to the study of the subsystems of variously interrelated retail and wholesale units of which the retail and wholesale trades consist, and through which the manufacturers reach the market. I think that studies belonging to both of the main categories outlined above suffer from this neglect. For instance, it seems to me that in any prediction of structural development in the retail trade, it is important to consider the centralization of decisions with regard to establishing and closing down stores in the systems of which the retail units are members. Moreover, few marketing decisions made by the manufacturer can be effectively analysed, unless the nature of the marketing systems of retail and wholesale units through which the products reach the ultimate buyers is taken into account.

One property of the marketing system interests me, a priori: the degree of integration. It seems to me that although intrinsically important with a view to behavior and efficiency in marketing systems, the concept as used in the marketing literature is rather vague and ill-suited to its purpose.

To summarize, I was inspired to undertake this study by (a) developments in the distributive trades, and the various questions these have raised among distributors and manufacturers; (b) my belief that, for many problem areas in marketing, it is important to recognize systems of retail and wholesale units rather than units in isolation; (c) my recognition that various aspects of integration are important as properties of marketing systems; (d) the relatively little material on the subject in marketing literature.

Aim of the Study

First a brief methodological note. I distinguish between two levels in a scientific discourse: the *model level* and the *description level*.[4] Reports on observations and measurements of attributes in real systems, i.e. empirical studies, are carried out on the description level. At the model level we are dealing not with real systems but with simplified conceptual models of such systems.[5] For several reasons, a discussion of which would be too lengthy here, it is important in research reports to distinguish between statements about models and statements about real systems; also, to be aware of the various problems connected with the relations between real systems, models of real systems, and measurements in real systems. Some of these problems will be discussed in chapter 10.

Against the broad background presented at the beginning of this chapter, my aim in this study is:

a) to develop a *system of integration concepts*,
b) to *measure integration variables* in some marketing systems in the food trade, and
c) to create *an analytical framework that relates integration and efficiency variables* in a marketing system.

Points (a) and (c) will be treated on the model level, and (b) on the description level.

The aim of the study can also be formulated in terms of its intended "usefulness". As I have already indicated, I had originally a general belief in the *significance for various marketing problems* of the integration concept and the system-oriented approach. More specifically I thought that the system of concepts and the efficiency analyses developed in this study could be of some help to decision makers in marketing systems, and to manufacturers selling through the systems, in their analyses of integration and marketing problems. My aim is not, however, to provide any solutions to specific decision problems, but simply to suggest a way of looking at some important variables and their interrelations.

Another aim has been to provide some basis for *further research*. This is particularly important, since the concepts and analyses of this study will be of much less interest if they are not followed by further research, for instance along the lines suggested in chapter 10.

The purpose of the study has, of course, undergone some changes since the

[4] Danielsson (1965, ch. 1), Danielsson & Törnebohm (1968, ch. 1).

[5] The word description (in Swedish "beskrivning") in the concept *description level* may be somewhat misleading, at least to Swedish readers. I am not using the term here in its more usual meaning as something opposed to "analysis". *Description level* is a concept used to indicate that the presentation concerns attributes of real systems that have been observed by some measurement technique. The word "description" in itself is in this study used on both the model level and the description level. A section on activities in the marketing system model where attributes of the activities are discussed is for instance headed "Description of Activities" (p. 19).

start. Originally I had no intention of devoting so much attention to the concepts. Instead I intended to compare various aspects of efficiency between systems with different degrees of integration, and to construct some quantitative models for analyses of some specific relations between integration and efficiency. As work on the study proceeded, however, I became convinced that there would be little point in committing considerable resources to the inherently difficult task of efficiency measurements, without first devoting a great deal of work to the development of concepts. Further, if the quantitative model analyses were founded on a weak conceptual base, and the models themselves could not be referred to a broader frame of reference with regard to the relations between integration and efficiency, then we should find our models too disconnected from any broader framework.[6]

Plan of the Study and Preview of its Content

The study is divided into two main sections:

a) *Chapters 3—6* in which a system of *integration concepts* is developed and some measurements reported.
b) *Chapters 7—9* which contains analyses of *the relations between integration and efficiency.*

Chapter 2 contains a model of a marketing system and provides a foundation for both the main sections. There is also a concluding chapter on further research and possible applications.

A brief preview of chapters 2—10 follows.

Figure 1: 1 provides a survey of the contents of the report, showing the way the various chapters are related to each other.

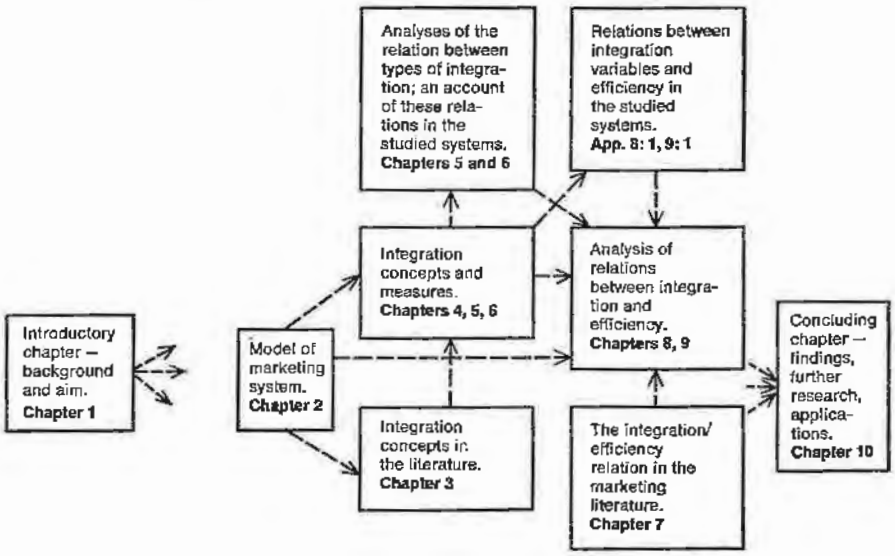
Chapter 2: The Marketing System

In this chapter I develop a model of a marketing system. The marketing system is seen as an input-output system, where the in- and out*flows* consist of goods, production factors, information and payments. These flows arise as a result of marketing *activities* carried out by *components* inside and outside the system. The internal components are retail components (=stores) and central components (=wholesale units and/or units administering several retail units). Flows between internal components are of the same type as between system and environment mentioned above. Internal components are also involved in other types of *relations,* with each other and with certain external components.

The total marketing activity of the system is divided into a number of *retail*

[6] Some comments on the course of the research process in this study can be found in appendix 1: 1.

Figure 1: 1 *Substance of the Report in Chapters, Showing Relatians Between These*



and *wholesale* activities. For every activity a *decision process* and an *execution process* is distinguished. A model of the decision process is developed in some detail. *Coordination* of the system's activities is recognized as an important task of the decision processes and some concepts for an analysis of coordination are presented. Criteria for the *delimitation* of the system from the environment are discussed in terms of interdependence, institutional relations and the relative size of certain goods flows.

Efficiency in the marketing system is viewed from the system's standpoint. Criteria of efficiency are defined at the end of chapter 2.

Chapter 3: The Integration Concept in Marketing Literature
Definitions are quoted from a number of writers and discussed in terms of our marketing system model. It is noted that a development of concepts is clearly needed for a number of reasons.

Chapter 4: Institutional Integration. Introduction to the Empirical Study
The system of concepts developed in chapters 4, 5 and 6 is based on a breakdown of the integration concept into (a) integration, rooted in the existence of certain *institutional* relations between components, (b) integration in the *decision* processes of the activities and (c) integration in the *execution* of activities.

Institutional integration refers to the legal power of the institutional relations between components.

There follows an account of the aim of the empirical study and a descrip-

tion of what systems and components are included. The institutional relations between the systems' components are described and, in light of this, their institutional integration is characterized. Chapter 4 thus proceeds first at the model level and then at the description level. This is also the case in chapters 5 and 6.

Chapter 5: Decision Integration

Integration geared to the decision process of the activities—or decision integration—is a measure of the "centralization" of the decision processes in a marketing system. The influence exerted by the central component on the decisions in a certain retail component operates through the sending of *control information.*[7] Control information is intended by the central component, directly or indirectly, to prescribe a smaller or larger number of action alternatives (*the controlling set*) from which an action alternative (*the chosen set*) is to be chosen. The control information also indicates the degree of "permissible" deviation of the chosen set from the controlling set. Decision integration is defined as the ratio between the number of elements in the *intersection and union* of the controlling and chosen sets.

The empirical measurements have been geared to rankings of the systems for each retail activity and a classification of activities into one of five classes of decision integration.

The operationalization of the concept involves interviews about, and observations of, the content of control information, and of the attributes of some factors that are supposed to affect the extent to which the intentions of the central component are realized. These factors are: execution of the activity at the central component, system of rewards, review information, and external information.

The rankings of decision integration turn out to be highly correlated with the ranking of institutional integration. Various tentative explanations of this are discussed.

Chapter 6: Execution Integration

Execution integration is concerned with certain aspects of the way in which marketing activities are executed and of the flows related to these activities. Four concepts are distinguished and their interrelations discussed.

Activity transference is concerned with one aspect of the division of work, within the system, between retail and central components. The activity transference is (a) greater for a retail activity, the greater the extent to which the activity is executed by central components and (b) greater for a wholesale activity, the greater the extent to which the activity is executed by retail components.

[7] The word "control" as used in this study has a wider meaning than the Swedish word "kontrollera".

Some activities are carried out by internal components *and* by some external components. *Internalization* measures the extent to which the activity is carried out internally. Internalization thus reflects an aspect of the division of work between system and environment.

Exclusiveness is concerned with the ratio between internal flows and total flows of goods, information, payments and production factors respectively. Flows are internal if both sender and receiver are internal components. The exclusiveness of the goods flows, for example, is divided into exclusiveness of flows *from* central components and exclusiveness of flows *to* retail components. The exclusiveness of the goods flow from the central component is thus defined as the ratio between the quantity of goods flow from the central component to the system's retail components and the quantity of total goods flow from the central component.

Homogeneity is concerned with uniformity in the way different components carry out the same activity.

The rankings of the systems according to the various variables expressing execution integration reveal a positive correlation both within and between themselves and a positive correlation between each variable on the one hand and decision integration and institutional integration on the other. Various tentative explanations of these results are discussed.

Chapter 7: Analyses in Marketing Literature of Relations between Integration and Efficiency Variables

This chapter contains a survey and critical analysis of the treatment of the subject in marketing literature. After a general review, I present a series of schedules summarizing the various variables and relations found in some twenty authors' analyses. Lastly I discuss some methodological issues.

Chapter 8: Decision Integration and Efficiency

In chapters 8 and 9 my purpose is to present a coherent, systematic analysis of what I consider to be the main relationships between integration and efficiency from the system's viewpoint.

I analyse in chapter 8 the relation between decision integration and the efficiency of the decision process. I regard the latter as a ratio between the level of goal fulfilment and the costs of the decision process. I first consider an independent retail activity and then extend the analysis to include, in various ways, interdependent activities. Lastly I consider how the analysis is affected by introducing some other variables, such as the decision integration of other activities, the execution integration, the institutional integration, and the environmental variables.

Chapters 8 and 9 proceed at the model level. An exception to this is the appendices to these chapters that contain an account of the changes in ef-

ficiency "resulting" from changes in integration, as noted by interviewed officials in the studied systems.

Chapter 9: Execution Integration and Efficiency
In this chapter I analyse the relation between each of the four execution integration variables and efficiency. In particular I discuss how integration affects—and how efficiency is affected by—some "main intervening variables", such as: the *size of the activity in a component*, the *bargaining strength of the system*, the *number of transactions*.

Chapter 10: Findings, Further Research, Possible Applications
In this chapter I first summarize, and in some respects evaluate, the results of the study. I also list the conclusions reached in chapters 8 and 9. I then suggest some problem areas and methods for further research. In conclusion I discuss some possible "practical" applications of the ideas put forward in the report:

a) *decisions about integration changes in a system.* Decision makers in the systems having to consider such changes, could find here a set of concepts and an explicit frame of reference which, although not suggesting any specific solutions, could help to "structure" the problems.
b) *decisions about the marketing activities of manufacturers.* Manufacturers' decisions must take into account the various interrelations in the marketing systems through which manufacturers reach, or try to reach, the consumers. This study may contribute to an understanding of the nature of such interrelations, especially integration variables and how they affect the behavior and efficiency of the marketing systems. For instance, in deciding on sales promotion, manufacturers must consider the allocation of decision processes regarding assortment in the marketing system between the central and the retail components. It might be misleading to regard the central component *or* the retail component as *the* decision making unit.
c) *forecasts of structural developments in the retail and wholesale trades.* Changes in the number, size, type of service system, assortments, etc. of retail and wholesale units should, according to the ideas put forward in this study, be analysed in light of the properties of the marketing systems in which they occur.
d) *analyses of social efficiency in the marketing sector.* In this study efficiency is viewed from the system's standpoint. However, parts of the analysis may be relevant to studies of performance in the marketing sector, from the point of view of society.
e) *decisions by the authorities enforcing the Swedish Antitrust Laws.* The authorities often have to consider cases which could be said to constitute a change in a system's integration variables, or suggest solutions that constitute such changes. Furthermore the authorities sometimes seem to judge an in-

crease in decision or execution integration differently, depending on whether the degree of institutional integration in the system is high or low.

f) *understanding the rationale behind various manifestations of marketing activities.* The sales promotion activity of the marketing system is a pertinent example. To understand why this activity is carried out in a certain way, we have to consider its effects not only (and perhaps not primarily) on the behavior of the consumers, but also on the system's relations with the manufacturers and on various integration variables in the system.

g) *decisions on the policy of trade associations in, or connected with, the marketing sector.* If we adopt the viewpoint of the system, rather than the individual unit in the system, it becomes clear that any tendency of the trade associations to consider one category of units rather than the system as a whole, could detract from the efficiency of the system. The present study might provide a background against which such questions could be analysed.

Chapter 2
The Marketing System

This chapter is of basic importance to my whole argument. Its longest section, following a brief discussion of the concept of systems in general and marketing systems in particular, is devoted to the presentation in some detail of a model of a marketing system. This model bears directly on the formulation of various concepts in the following chapters. It also affects the design of the subsequent empirical study and the analysis of integration and efficiency. A final section is concerned with the concept of efficiency in the marketing system.

System—A General Concept

A general and much quoted definition of system is: "A system is a set of objects together with relationships between the objects and between their attributes" (Hall & Fagen, 1956, p. 18).

Several writers on *general systems theory* have discussed the problem of characterizing and classifying systems. (To take a few examples, see e.g. Boulding, 1956; General Systems, 1956; and Mesarovic, 1964.) With this literature in mind I suggest that the following, briefly put, are some of the main attributes of the type of system we shall be studying below.[1]

a) The system is *open*, i.e. it has relations with its environment. "A system is closed if there is no import or export of energies in any of its forms, such as information, heat, physical materials etc., . . ." (Hall & Fagen, 1956, p. 23.)
b) The system is a *complex man-machine system*. This means that a description of the system is concerned with *human behavior*. Because it is so complex, a crucial question is to decide what is the smallest unit, or component, whose behavior and relations are to be studied.
c) The system is *adaptable*, i.e. it can, at least to some extent, adjust its behavior to changes in the environment. Adaptation is to a large extent achieved by the *feedback* of information from the environment about reactions to the system's behavior.
d) The system's behavior is geared to the fulfilment of certain *goals*. The system can formulate these goals and change them.

Points (a) and (b) indicate two basic problems: how can we delimit a

[1] Cf. similar descriptions of the attributes of organizations in e.g. Johnson, Kast & Rosenzweig (1967, ch. 3), and Ramström (1967, ch. 1).

system from its environment, and what are to be the smallest units of the system, i.e. the components?

Since the system is open, it will be related in many ways to the environment. Thus it is difficult, in a general way, to delimit the system from those parts of the environment "close" to it. The limits that we set will depend to a great extent on our reasons for studying the system at all, and on the constraints dictated by resources and methodology. However, these three factors are not sufficient alone to determine the limits of the system. Other criteria are needed. This will be discussed below, pp. 29 ff.

Regarding the second problem, that of defining the components of the system, we find that each component, by whatever definition, can in certain contexts be regarded as a system of smaller components. If our system is a company, then the components could be the various departments, *or* the men and machines that constitute the departments, *or* the parts that constitute the men and machines, etc. Naturally the choice is important. For example, a study of the decision process in a company will assume a different shape and come to a different result according to whether departments or individuals are the chosen components. For example, if the department is the smallest unit, it will not be possible, to note differences between individual and group decisions *within* it.

The delimitation of the system decides the size of the system to be studied, and the definition of the components decides the detail in which it is to be studied. I will here refer to the first of these as a decision on the *extent of the system* and to the second as a decision on the *size of the component*. A combined measure of these is expressed by the concept of *altitude*. (Danielsson & Törnebohm, 1968, p. 1—23). The greater the extent of the system and the larger the components, the higher is the altitude from which a study is made. (Altitude refers to the "position" of the observer/analyst in relation to the studied system.) It is often necessary to change altitude during a study. Sometimes, for instance, I speak of the "system" and sometimes of a "large system" (e.g. on p. 120); sometimes I speak of *three* central components in each system's hierarchy and sometimes of *the* central component, which is a combination of the three (e.g. on p. 78).

It is of course important that the researcher is aware of such switches in altitude and of their possible consequences for the analysis.

Marketing System – A Concept

A marketing system is a system that carries out marketing activities. So far, so good. But what is marketing? There is no generally accepted definition. However, a usual assumption is that certain "gaps" exist between the making and consuming of goods and that marketing is a force that bridges them.

"A concept of marketing in its widest sense, therefore, is any activity which ac-

qualizes the potential market relationship between the makers and users of economic goods and services" (McInnes, 1964, p. 57).

"If a market represents a separation—in space, time, perception, valuation, and ownership—between makers and users of economic goods, then some force is required to bridge the gap and realize the opportunity latently existing in the market potential. That force, or activity, we call marketing (ibid. p. 60).

Activities in the marketing system are carried out to ensure that the system can bridge the various gaps as required. In other words, the marketing system is there to create and maintain flows (goods, payments, information) between the producing and consuming systems. In fact, many of its relations with the environment can be expressed as various types of flow resulting from the marketing activities.[2] Work is divided among the various components in the system. Internal flows in the system are therefore necessary.

Figure 2: 1 represents a model of a marketing system showing some of the flows (goods and information). If we compare system A and system B, we find that the extent of A is larger because it contains consumer components and several production components. Component C may, in a study from a low altitude, represent a marketing system in itself, as is indicated by the dashed

Figure 2: 1 *Illustration of a Marketing System*

Key:

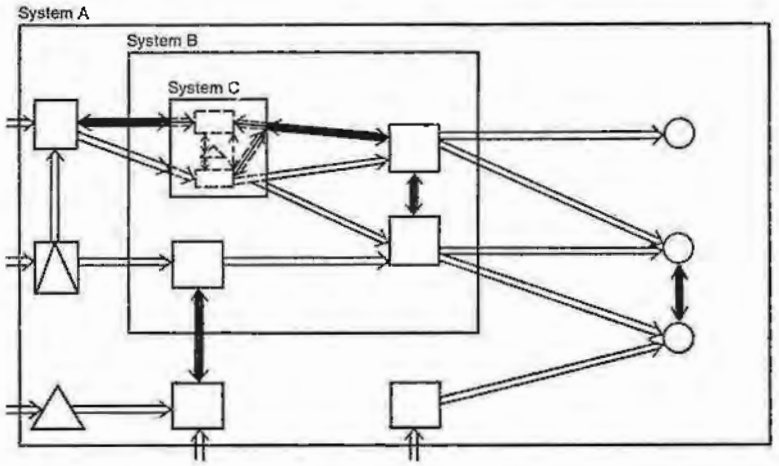
□,△,○ = Component for marketing, production and consumption activities, respectively

⟹ = Flow of goods (including two-way flow of information)

➡ = Flow of information only

——— = Boundaries of the system according to alternatives A, B and C

– – – – – = "Subcomponents" within component C



[2] Cox, in particular, has been associated with the development of the flow concept in marketing. See e.g. Vaile, Grether & Cox (1952) and Cox (1965).

lines, or, if we choose larger components, system B can appear as a component of system A.[3]

Some recent studies of marketing systems provide examples of different altitudes.

Cox (1965) describes the total US marketing system. The components are statistical aggregations of companies or working places as classified in the Census of Business. Artle (1959), in an input-output analysis, describes the economy of Greater Stockholm. He sees it as a system with internal flows between various industries (sectors), and external flows between these and the rest of the nation and the rest of the world. In both these studies the chosen components and system are large.

Skår (1964) and Balderston & Hoggatt (1962) are studies from a lower altitude. They both study systems whose components are individual companies marketing a specific class of goods. Skår is concerned with the marketing system for glass and china in Norway. He describes among other things the structure and structural changes per number of components, the composition of goods flows between components, and the competition and cooperation between components. Balderston & Hoggatt, using simulation, analyse behavior, structure and performance in a marketing system consisting of raw material suppliers, two levels of distributors and the ultimate buyers.

Studies with an operations research approach are often geared to smaller components, such as parts of a company. Balderston (1962), for example, is concerned with the activities in multiple branch organizations. Forrester (1961) suggests a method called industrial dynamics for treating flow interactions in marketing and/or production systems. This method is also intended to apply to studies from higher altitudes, even of macrosystems on the scale of a national economy. Models for analysing various aspects of physical distribution (storage, materials handling, transport) often provide examples of studies from a low altitude. See e.g. some of the articles in Scarf, Gilford & Shelly (1963) and Marks & Taylor (1967).

These examples can serve to illustrate the various meanings attached to the concept of marketing system, also the many directions in which studies of the system may point.

Model for the Present Study

The system consists of components which *make* and *implement* decisions about marketing *activities*. This means that I distinguish between the *decision process* and the *execution process* of an activity. The activities generate *flows* between components in the system (internal flows), and between components and en-

[3] Cf. Fisk (1967, pp. 77 ff.) who has classified marketing systems into seven levels, ranging from the individual worker to the world economy.

vironment (external flows). The flows represent one of many relations between components.[4] The *environment* is divided into sectors. We can now look briefly at the various parts of the model and how they relate to each other.

The Components

I distinguish two main types of components: *retail component, RC,* concerned chiefly with retail activities and consisting of production factors located in a specific, geographically delimited work place, i.e. a store; *central component, CC,* concerned chiefly with wholesale activities and/or decision processes for retail activities and consisting of production factors located in *one or more* geographically delimited work places, i.e. one or more wholesale and/or administrative units. A system may contain more than one central component.

A central component is hierarchically superior to a retail component for one or more of the following reasons: CC transmits goods to every RC in the system and exchanges information with all the RCs. This places CC at the transmitting or receiving end of flow relations that are important to every RC. CC can also have formal or informal authority over RC.[5]

Several writers have discussed the existence of hierarchies in systems. Alderson has applied the argument in particular to marketing systems. He postulates a control group in the system which makes the strategic decisions about goals and the techniques for achieving them (Alderson, 1964, pp. 95 f.). Simon (1960, p. 40) has suggested that complex systems are almost always hierarchically arranged.

I assume that components can participate in decision and execution processes. By means of their activities they can transform input flows into output flows. Thus components affect the internal and external flows; they also generate behavior whose efficiency, in terms of the relation between input and output, can vary.

Internal and External Flows

The existence of flows—internal and external—follows from the purpose of the system to overcome the separation between makers and users of goods and from the recognition of the division of work within the system. Basic attributes of flows are:

[4] The term *relation* is used in this study in its general, broad sense, indicating some sort of association, link, interaction, etc. which may not always correspond to the relation concept in set theory. In this study *relation* and *relationship* are used as synonyms.
[5] Formal authority is based on the existence of various sanctions legitimated by institutional relations. Informal authority may exist because RC considers that CC possesses expert knowledge relevant to some of RC's activities. (See Ramström, 1967, pp. 204 ff. for a further elaboration of these concepts.)

a) Flows are *directed* from an emitting to a receiving component.
b) Flows are a *type of relation* between pairs of components.
c) Flows in a marketing systems are *noncontinuous*. Nevertheless, the number of transactions per period of time is often large and the flow relationship between a pair of components often exists during many such periods.
d) Flows are generated by the execution of *marketing activities* by internal or external components (and with regard to some information flows, also by the decision processes of marketing activities).

The following main types of flow are distinguished here: goods, information, payments, production factors. These types will later be further subdivided. Production factors, for example, will be broken down into manpower, premises, materials.

My reason for choosing these flows is that they are necessary to the adequate functioning of the system. To generate *flows of goods* can be said to be the primary purpose of the marketing system.[6] To bridge some of the gaps mentioned above, and to facilitate decision processes in the system, there must be *flows of information. Payments flows,* sometimes even between internal components, are necessary because the system functions in a market economy. Lastly, *production factor flows* enable the system to maintain and/or develop its capacity to make and implement marketing decisions.[7]

The flows will be described in greater detail when they appear in the course of the argument below. In the meantime, here is a brief note on some of their characteristics. All flows can function in both directions between system and environment.

Goods. These flows comprise the transfer of consumer goods. Returns from

[6] It is also possible to observe systems for the marketing of services, but we shall not be concerned with these here.

[7] This choice of flows can be compared with that of some other writers. Johnson, Kast & Rosenzweig (1967, p. 114) maintain that "all inputs or outputs in the design or operation of a system can be classified as information, energy or materials.". "Energy" corresponds to my production factors and "materials" to goods. The flow of payments has not been included. In Forrester's industrial dynamics model the concept of flow holds a position of major importance. Industrial dynamics covers the interaction between the flows of information, money, orders, materials, personnel and capital equipment in a company, an industry or a national economy. (Forrester 1961, p. 13.) This classification of flows differs from mine only in that the flows of information and production factors have been further subdivided.

Fisk (1967) classifies flows as information, promotion, negotiation, order, payment, financing, ownership, physical possession and risking. The first four of these can be seen as different types of information flow. "Payment" and "financing" correspond to my flow of payments, and "physical possession" to my flow of goods. I differ from Fisk in including a flow of production factors but this is because, unlike most writers on marketing, I have included acquisition of resources among the marketing activities of a marketing system.

retail component to central component and flows between two retail components do not appear in the model. Producer goods (i.e. material etc. used for carrying out marketing activities) are included among production factors.

Payments. These flows comprise "money" transfers between components. Transfers may take place without any intermediary. Alternatively a component outside the system (e.g. a bank) or inside it (e.g. central account current) may be involved. Payments flows do not appear between components on the same level in the system; between components on different levels they can flow in both directions.

Production Factors. Production factors are *manpower, materials and premises.* Materials includes machinery, fixtures, working material etc. By premises I mean the right to certain buildings and space, either by ownership or rent agreement, where the component can carry on its activities. Production factors can flow in both directions between components at different levels in the system. Manpower can also flow between components on the same level.

Information. This concept has been variously interpreted, and three main approaches can be distinguished (Morris, 1938).

a) The information concept is related to the description of abstract or concrete objects contained in a message. This is information on a *semantic level,* referring to the relations between signs and the objects to which they are applicable.
b) The information concept is related to the influence of a message on a decision maker's choice of action alternative in a specific situation. That is to say, the information is judged according to its value to a decision maker. This is information on a *pragmatic level,* referring to the relations of signs to their interpreters.
c) The information concept is related to the formal construction of the message, i.e. the properties of the signs and the relations between them. This is information on a *syntactic level,* referring to the relations of signs to other signs.

In this study the term *information* is used in its semantic meaning. Thus a message which is of no value to the receiver nevertheless contains information. Neither does the formal construction of a message in itself affect the quantity or quality of the information. However, general attributes of flows such as transfer technique, number of transactions etc., represent dimensions in the descriptions of information flows, although they are not attributes of information in a semantic sense.

Generally speaking all flow characteristics can be expressed in terms of:

a) quantity per time period
b) quantity per transaction
c) quality (in a broad sense) per time period
d) quality per transaction
e) number of transactions per time period

f) transfer technique
g) timing of transaction

Other Internal and External Relations

In view of our system-oriented approach, many kinds of relations must be recognized. Relations that directly express *interdependence* between components are of course important. Other examples are: *institutional relations*, expressed by ownership, cooperative agreement, etc., *geographical relations*, expressed by spatial proximity, etc., and *decision process relations*, expressed by the existence of control information (p. 57), etc. The various kinds of relations (flows and others) can be used to describe the "proximity" of various components to each other and thus provide criteria for delimiting systems.[8]

Activities in the Marketing Systems

Marketing activities have to be carried out by the components so that flows are transferred. (It is of course also possible to say that the flows affect the way the activities are carried out.) These activities can be arranged in a hierarchy. Figure 2: 2 illustrates part of the hierarchy that we shall be using below. The reader should note three ways in which my division of activities deviates somewhat from the usual division in marketing literature. First, I do *not* include *the consumer's marketing activities*. The consumer sector represents here part of the environment of the marketing system. Secondly, I include *internal company activities* when parts of a company constitute separate components. This is because I wish to be able to compare marketing systems whose components are parts of a company and systems whose components are legally independent companies. I therefore introduce the term "change in right of disposal" instead of "change in ownership" to represent one group of activities. Thirdly, I include the *acquisition and transformation of resources*, in so far as it is required for the other marketing activities.

Marketing activities as a whole can first be divided into *wholesale and retail activities*. Retail activities are usually defined as referring to the transmission of goods to the consumer, and wholesale activities to the transmission of goods to all other types of buyers.[9]

We can classify activities according to the flows to which they are directly related. Thus, a *retail activity* has one of the following characteristics:

a) An activity which directly affects, and is affected by, flows received or emitted by consumers, is a retail activity.

[8] Odhnoff (1967) describes the proximity of large Swedish companies to one another, starting from the presence of relations that define various "structures", such as economic-geographical, ownership, bank customer, kind of industry structure etc.
[9] af Trolle (1963, p. 60).

b) If flows with consumers are to be possible, then components carrying out retail activities according to (a) will also have to have certain flow relations with other components: inflow of goods, in- and outflow of information, outflow of payments. Activities related to these flows are also classified as retail activities.

c) Activities which are directly related to the flows of production factors used in activities under (a) or (b) are also defined as retail activities.

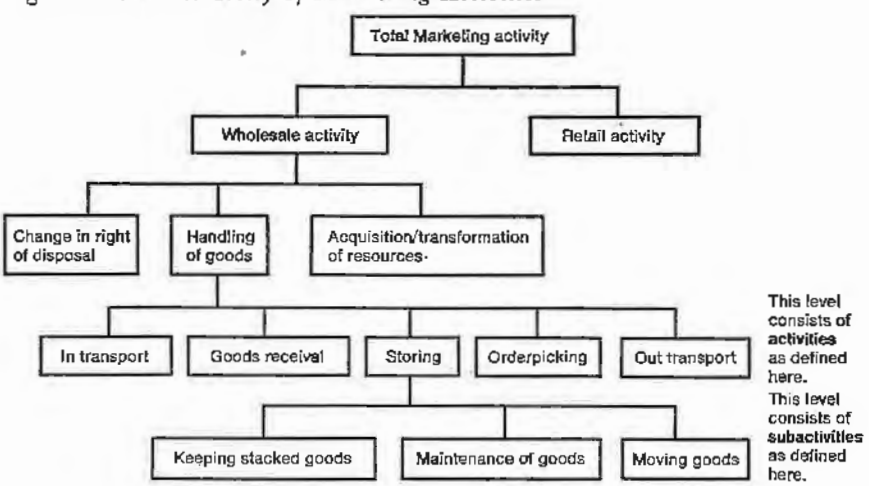
If an activity has none of the above characteristics, it is a *wholesale activity*.

At each level—wholesale and retail—activities can then be divided into three groups, *change in right of disposal, handling of goods* and *acquisition/transformation of resources*. These groups are chiefly related to information/payments flows, goods flows and production factors flows respectively. The division of activities is shown in schedule 2: 1. Definition, delimitations, subactivities etc. are treated in detail in appendix 2: 1. Some of my reasons for choosing this particular division of activities are as follows.

First, the subject of this report is the relation between integration and efficiency. This has affected, for example, my treatment of purchasing. Purchasing is sure to have a considerable effect, direct and indirect, on the internal flows of goods, payments and information; this means that the values of the integration variables for the activity will be of such great interest, from the viewpoint of efficiency, as to motivate a further breakdown. Purchasing is thus represented by four activities: *choice of assortment, choice of suppliers, ordering* and *payment routine* (*purchases*).

Secondly, my classification of activities in the model had to be reasonably easy to operationalize for the empirical study. This meant that it must be easy for interviewees to understand and be recognizably like their real-life experience.

Figure 2: 2 *A Hierarchy of Marketing Activities*



Schedule 2: 1 *Division of Activities*
(Definitions, limits etc. are treated in appendix 2: 1.)

Wholesale activities	**Retail activities**
Change in right of disposal	*Change in right of disposal*
Choice of assortment	Choice of assortment
Choice of suppliers	Choice of suppliers
Ordering	Ordering
Pricing (to retailers)	Pricing
Selling/order receival	Sales promotion
Payment routine (purchases)	Service
Payment routine (sales)	Payment routine (purchases)
	Payment routine (sales)
Handling of goods	*Handling of goods*
In transport	Goods receival
Goods receival	Prepackaging (perishables)
Storing	Price marking
Orderpicking	Positioning of goods/refilling of shelves
Out transport	Storing
	Checking out
Acquisition/transformation of resources	*Acquisition/transformation of resources*
Acquisition of capital	Acquisition of capital
Establishing wholesale units	Establishing stores
Closing down wholesale units	Closing down stores
Acquisition of managers	Acquisition of managers
Acquisition of other personnel	Acquisition of other personnel
Acquisition of material	Acqnisition of material
Training	Training

Thirdly, I wanted the activities to be as clearly delimited as possible, although overlapping could not always be avoided. The pricing of sales promotion items, for instance, is a subactivity of the activity *sales promotion*, but it also comes into the activity *pricing*.

Description of Activities

An activity consists of the decision process and the execution process. The output of the decision process is a *decision*, i.e. a choice of an action alternative which is then implemented by the execution process. For each activity we can specify a number of attributes or *dimensions* in which the chosen alternative can be described.[10] For instance the execution of *sales promotion* can be described in the following dimensions.

a) Identity of articles (i.e. what articles are the subject of the sales promotion measures?)

[10] This presupposes that the alternative has been specified only with regard to attributes controllable by the acting component. For instance, prices can be specified in a description of the chosen and implemented alternative for *sales promotion*, but not the quantities to be sold, since consumer decisions will presumably affect this.

b) Price (i.e. at what prices are these articles sold?)
c) Quantity of each article ordered
d) Display (i.e. what are the positions in the store of articles included in the sales promotion activity?)
e) Advertising media

On the whole the relevant dimensions for each activity in this study are different. Nevertheless they all belong to one of the following classes: *space, time, technique, quality* or *quantity*. Some activities may be described in more than one dimension of each class. On the other hand, all these classes are not necessarily represented for each activity. Various dimensions of the activities appear in appendix 2: 1.

Clearly some sort of restriction in time will have to be imposed on descriptions of the activities. Some activities are carried on continuously by the component. *Choice of assortment* and *pricing* are two examples: a certain assortment must be kept in constant supply; prices exist all the time. Some activities are noncontinuous but frequent such as *ordering, transport, goods receival,* all of which arise in connection with flow transactions. Some activities occur only at fairly rare intervals, e.g. *establishing stores, closing down stores, acquisition of managers.* In the last case the delimitation in time of an activity description does not present the same difficulty as in the first two cases.

To describe the continuous type of activity we can limit ourselves to the characteristics of the activity during a short period of time (e.g. prices in the course of one day, assortment during one week, suppliers used in the course of a month). The characteristics of intermittent activities can be described each time the activity recurs. *Ordering,* for example, can be described in terms of quantities ordered, timing of the information transfer, and technique for this transfer with the specification referring to one occasion. The description can also consist of the separate specifications for several occasions during a time period.

The various dimensions of an activity can be described as sets, whose elements are possible characteristics of the activity. Execution of the activity can be described in terms of one or more elements from each of these sets. This point will be amplified in chapter 5. For the present I will illustrate the argument briefly by an example.

The execution of *ordering* on a particular occasion, can be described in the dimensions *time, technique* and *quantity. Time* consists of the set of time intervals during a period (e.g. days during a week). One element of this set describes execution in the time dimension. Similarly, in the *technique* dimension, execution is described as one element from the set of possible techniques (e.g. written orders, telephone orders, etc.). The *quantity* dimension is described by elements representing ordered pairs from two sets: the set of articles as decided by the activity *choice of assortment* and the set of possible purchase

quantities. The execution is described by one ordered pair representing each article.

The execution of an activity can also be described in terms of (a) the amount of production factors sacrificed, i.e. the *input* into the activity, and (b) the result, i.e. the *output* of the activity. These characteristics provide measures of the *size* (or *extent*) of the activity.[11] The inclusion of *size* in our model is useful to our present aim in several ways. For instance, we can now see how the execution of an activity is divided among components in the system or between system and environment; we can see how great a part of any one activity falls within the range of certain phenomena affecting integration; we can see what effect size may have on efficiency. In the first two cases we are thus simply providing ourselves with relative yardsticks.

In the case of output—and particularly if it is a relative yardstick that we are looking for—it is often possible to describe size in the same terms as those used for describing flows. Let us take *price marking* as an example. If we are looking for an absolute measure, we can use the number of articles marked. If, on the other hand, we need a relative measure, then the sales value of these articles can be used to get an adequate approximate yardstick. Examples of this are given in appendix 2: 1. In describing the input into an activity we come up against the problems of cost allocation (see e.g. Danielsson, 1968; Frenckner, 1954; Solomons, 1968). A discussion of these problems lie outside our present scope.

Decision Process of an Activity

In the decision process of an activity information is processed until a choice is made among the possible action alternatives.

Three types of information processing can be distinguished in this context:[12]

a) *transmission* (transfer) of information between components
b) *storing* of information in the human or mechanical memories of components
c) *transformation* of information, consisting either of transitions between stages in the decision process or reformulations of transferred or stored information, such that the description of the various stages is affected. (The concept of decision stage is defined below.) An example of the first type of transformation is the calculation of profitability estimates based on descriptions of goals, action alternatives and states. An example of the second type is a change in the number of potential goal formulations transferred to the component and stored there.

A component participates in and affects the decision process of an activity by taking part in one or more of these types of information processing. A component taking part in the transformation of information in a decision

[11] *Size* and *extent* will be used as synonyms when characterizing an activity.
[12] Cf. Ramström (1967, p. 93), where a similar subdivision is to be found.

process is here defined as a *decision maker*, however small its influence on the final choice of action alternative may be.

The decision process is divided in our model into the following *levels: general decision* process, *action decision* process and *review* process.[13] General and action decision processes can each be divided into the following *decision stages:* (1) *initiation,* (2) search for and formulation of (a) *goals,* (b) *action alternatives* and (c) *state descriptions,* (3) *estimation of outcomes* and (4) *choice.*

The *action decision* determines execution on a particular occasion or for a particular period by a given component. The set that describes the chosen action alternative also describes the execution, using the various dimensions. Thus it is assumed that even purely routine actions are preceded by a decision.

General decisions affect, or are assumed by the decision maker to affect, several action decisions. General decisions influence one or more or all the stages in the decision process leading to the action decision. The "amount of influence" can vary. A general decision may, for instance, prescribe a complete program for the execution of the activity, leaving only initiation and acceptance of the program in the given situation to be decided later. At the other extreme, a general decision may consist of some slight influence on one of the many stages in the decision process, e.g. on what types of stimuli should invoke a decision process or what rules for the estimation of outcome should be applied in a particular situation.

General decision processes also provide a body of accumulated experience within the system: information about the consequence of a particular decision will, by means of review information, affect future general decisions. Some general decisions extend through time and space: programs which increase the degree of routinization and standardization of action decision and execution processes can thus be worked out. *Routinization* refers to uniformity in time. *Standardization* refers to uniformity in space (i.e. as between components).

General and action decision processes regarding a certain retail activity may occur in central components as well as in the retail component carrying out the activity. The action decision, that is the final decision to act, is always made by the *acting component* itself. (The acting component is the one that implements the decision.) Another component, however, may suggest or even prescribe a specific action decision which may or may not be accepted by the acting component.

In this study *review* is that part of the decision process by means of which

[13] My division into general and action decision processes corresponds to the hierarchical structure of the decision process, postulated by many writers. (Cf. e.g. Carlson & Kusoffsky, 1966; March & Simon, 1958, p. 190; Simon, 1960, p. 42.)

information about the activity and its consequences is collected after its execution.[14]

Review provides a basis for evaluating the execution of an activity; future decisions can thus be adjusted in light of the experience gained. In other words, the review process feeds back information into the system and this is an essential feature of adaptative systems. The relevant information processing may take place within the acting component and/or in other components contributing to the decision process concerned.

I have distinguished between the *decision process* and the *execution process*, although sometimes such a dichotomy can create problems of definition. In appendix 2: 1 I have defined the boundaries between decision and execution in the activities we are studying here. Generally speaking it is easier to define the boundaries of activities directly related to the flow of goods, money or production factors; it is less easy when the activity affects the flow of information.

Let us look at some examples. An activity related to the flow of goods is *out transport*. The decision process here will determine the characteristics of the execution: when, how far, by what route and in which type of vehicle, etc. Execution will consist of the actual transfer of goods. Two activities directly related to information flows are *ordering* and *pricing*. *Ordering* is executed by sending information to the supplier with details of quantities ordered. On the other hand, stocktaking and reception of supplier information intended to affect the choice of quantity, belong to the decision process. In *pricing* the decision process consists of choosing prices for the articles sold by the component; execution consists of keeping the goods available for sale at the price decided.

The various *decision stages* in the general and action decision processes have already been listed. The decision model is illustrated in figure 2: 3. In defining and describing the various stages, I have followed patterns suggested in recent behavior-oriented organization literature. (Cyert & March, 1963 and March & Simon, 1958, provide the basis for the following.) Note that there may be "loops" between the different stages in a single decision process leading to a decision. For example, search may be renewed if no satisfactory alternative emerges from the estimation stage.

1) *Initiation* is the external or internal stimulns which sets off the decision process. Feedback information is an important example of such a stimulus. Information sent from a component, inside or outside the system, may be specifically intended to initiate a decision process.
2) Goals, action alternatives and state descriptions are not given from the

[14] The concept of *review* seems to correspond more closely to the Swedish word "kontrollera" than does the concept of control as used in this study. Control means here purposeful, intentional, influence on the decision processes exerted by the system's central components. See also ch. 5. Cf. also discussion of the concepts *control* and *review* in Danielsson (1963, pp. 1 ff.).

start. Search and formulation are in themselves an important part of the decision process.

a) *Goals* can be single- or multidimensional; they may be expressed as an acceptance level or a striving for optimization. Goals may or may not be on the same level in a "goal hierarchy".

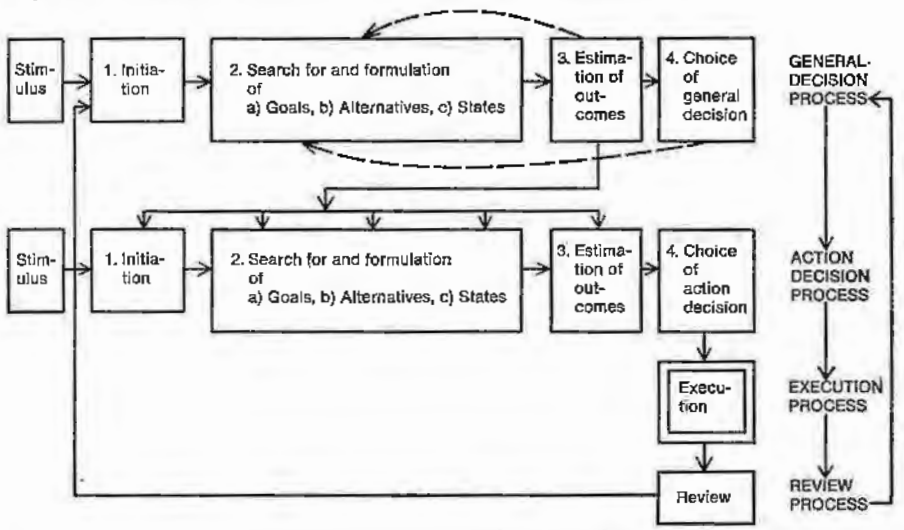
b) Search for *action alternatives* can take place within the component, in which case it consists of the search for, and possibly the transformation of, stored information; or it can take place outside the component and consist of the transfer of information from other parts of the system or from the environment. This transfer may be initiated by transmitter or receiver.

c) *State descriptions* are concerned with variables which affect the values (in goal dimensions) of the various alternatives. The decision maker cannot be certain in advance which state description is true. State descriptions vary in detail and degree of explicitness. They may result from an active search for information and/or an application of the decision maker's previous experience and/or the reception of information from another component.

3) The *estimation of outcomes* transforms combinations of action alternatives and state descriptions into values for the alternatives expressed in the goal dimensions.

4) *Choice* is the output of the decision process. Only in extreme cases is it fully determined by a description of earlier stages in the process. It cannot be assumed that the decision maker's choice will always be consistent with the

Figure 2: 3 *Levels and Stages in the Decision Model*



(Broken arrows represent examples of loops in the process.)

earlier stages of the process. Moreover, the decision process at one or more stages may be so incomplete that it is difficult to say what a consistent choice would be. Choice on the general decision level implies that information about one or more decision stages (not necessarily including action alternatives) is transferred either to an action decision process or to some other general decision process. (Figure 2: 3 includes the first of these alternatives only.) For example, choice at this level may simply refer to goal recommendations or estimate rules, or a specification of some types of alternative which, generally speaking, should always be investigated in a particular decision situation.

Decision processes can vary very much in compass. One may include comprehensive, conscious, considerations and search before the decision is made. In another case an external stimulus can invoke execution of the activity, apparently without any conscious intermediate decision process.

Interdependence and Coordination Between Activities

Degree of Interdependence

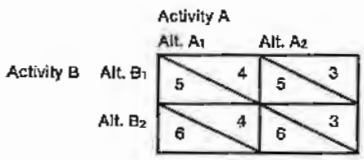
Two activities A and B are *interdependent* if the outcome for at least one of the action alternatives of A is affected by the action alternative chosen for B,

Figure 2: 4 *Interdependence as Determined by the Formulation of Action Alternatives and Goals*

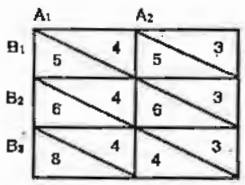
The figures indicate the value of the goal variables.

1) *The formulation of alternatives*

a) No interdependence.

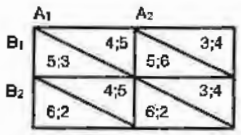


b) Interdependence arises as a result of the addition of another action alternative for B.



2) *The formulation of goals*

Two goal variables. Interdependence according to the second but not to the first variable.



and/or vice versa.[15] In other words, interdependence implies a causal relationship between activities.[16] Our description of the decision situations will determine whether or not interdependence exists. The example in fig. 2:4 can illustrate this.

In case (1a) the activities are independent of each other. The outcome of B is not affected by the choice of alternative for A and vice versa. Maximum goal achievement is possible for both activities, separately or together, regardless of the decision process of the other activity. In case (1b) a third alternative, B_3, has been included. Now the outcome for B will depend on the alternative chosen for A. The activities have become interdependent. In case (2) the activities are interdependent according to the second goal variable, but independent according to the first.

It belongs to the nature of the system concept, that interdependence between activities is the rule rather than the exception. Even between activities inside and outside the system, interdependence is very common, for example on account of the flow relations. Thus, if we can find a way of defining the *degree of interdependence*, the concept should provide us with a useful tool. It could throw some light, for example, on the problems of system delimitation and coordination.

The *degree of interdependence* between activities here reflects the relative size of the change in goal achievement for A, as the result of a change in the action alternative of B and vice versa. Thus we must decide on a base of comparison for the changes in alternatives and outcomes. I suggest that the base alternatives are those chosen in the previous period. Let us then assume that the alternative for activity B undergoes a change, within arbitrary limits defined as "relatively small change"; it is then possible that the outcome for A's (unaltered) alternative may change. To estimate the degree of interdependence, we take the B alternative that offers the greatest positive or negative relative change in the outcome for A's base alternative. We repeat this calculation for the opposite case, where the alternative for A changes, with possible effects on the outcome for B's base alternative. The degree of interdependence between activities A and B is higher, the higher the relative change in outcome for A resulting from "relatively small change" in the action alternative of B, *and* the higher the change in outcome for B, resulting from a change in alternative for A.

[15] If A is affected by B, but B is not affected by A, A and B are nevertheless said to be interdependent since we are interested in goal attainment for both A and B. Thus evaluations of the decision for B must consider not only the goal value of B but of A as well.
[16] Cf. Magnusson (1963, ch. 3) and Ramström (1967, p. 219 f.) where definitions of interdependence are based on the existence of causal relationships.

Interdependence between components exists as soon as any activity of one component is interdependent with any activity of the other. The degree of interdependence between components increases with the proportion of activity pairs showing interdependence, and with the degree of these interdependencies.

Reasons for Interdependence

Reasons for interdependence between activities are assumed to be the existence of *common resources* and/or various attributes of *technical* or *market processes*.[17] Technical processes, for example, may make activities chronologically dependent on one another, for example the activity pair *ordering* (retail) and *selling/order receival* (wholesale); or perhaps one activity affects the characteristics of a flow, which in turn affects the conditions of another activity, for example the pair *out transport* (wholesale) and *goods receival* (retail); or the techniques of one activity may affect the technological conditions of another, for example *prepackaging* and *price marking*. Mutual dependence between *different* means of competition in "the marketing mix" provides an example of interdependence between activities based on the attributes of market processes, e.g. *choice of assortment* and *pricing;* mutual dependence between components with regard to the *same* activity, e.g. *pricing* or *sales promotion,* provides another.

Coordination of Decision Processes[18]

If, from the system's point of view, we want the decision processes to lead to a high degree of goal fulfilment, attempts must be made to coordinate interdependent activities. The greater the degree of interdependence, the greater the *need for coordination. Coordination* involves the processing of information, as a result of which the need for coordination is, to a greater or lesser extent, satisfied. The *degree of coordination* tells us how well the decision processes of activities are coordinated from the system's point of view. The highest degree of coordination between two activities A and B will exist if no more information processing about B in A's decision process, and about A in B's decision process, can increase the goal attainment for the combination of activities A and B. The less the goal attainment, as a consequence of "insufficient" information processing about the other activity in each activity's decision process, the less the degree of coordination. The goal variables for A and B do not

[17] Cf. March & Simon (1958, p. 122), where the factors "resource allocation" and "scheduling" are discussed.

[18] Coordination refers to the coordination of the decision processes, unless otherwise stated.

include the costs incurred by either of them for processing information about the other. These costs will be known here as *coordination costs*.[19]

Different Methods of Coordination

Coordination between components can be achieved by the transmission of information either directly between the components or via a third one. Let us look at two extreme examples. A component at a higher level prescribes action decisions for both the activities; these decisions are accepted by the two acting components. This represents the extreme of centralized coordination. Or, two components on the same level transmit information to one another, or observe one another's behavior; they receive no guidance from a third component about how they should deal with the information thus obtained. This represents the extreme of decentralized coordination. Coordination processes can thus be described in terms of the degree of centralization or, according to this study's terminology, the degree of decision integration. The first of these examples can be described as coordination through full decision integration and the second as coordination without any decision integration. The concept of decision integration will be discussed in detail in chapter 5.

Of the two types of coordination described by March & Simon (1958, p. 160), "coordination by plan" and "coordination by feedback", the former represents greater centralization than the latter. But neither method is of the extreme type described above. According to the linear programming approach, the solution to the problem of utilizing limited resources in a system can be achieved in one of two ways. Either a central decision maker issues orders about how the resources should be utilized, or he influences the various decentralized decision makers by pricing the resources at the "dual prices" (see e.g. Dorfman, Samuelson & Solow, 1958). The first represents an extreme degree and the second a high degree of centralized coordination. Internal pricing and budgeting are other methods of coordination which lie somewhere between the two extremes. (See e.g. Frenckner, 1954; Hirschleifer, 1964; Stedry, 1960; Whinston, 1964).

Ramström (1967, pp. 223 f.) discusses the two concepts of direct and indirect coordination. In cases of indirect coordination two components coordinate through a third and, usually, superior component, whereas direct coordination only involves those components that carry out the activity. If we limit our discussion to components on the same level in the system, then indirect coordination corresponds more nearly to centralization than direct coordination. But if coordination between components on different levels is included, then direct coordination too may represent a high degree of centralization.

At the macroeconomic level, a distinction is usually drawn between coordina-

[19] Cf. Baligh & Richartz (1967, pp. 111 f.), whose concepts *level of coordination* and *coordination costs* are similar to the corresponding concepts as developed in this subsection.

tion through government planning and coordination through market prices. Naturally there are many intermediate forms. (See e.g. some of the essays in Bornstein, 1965). Certain models of planned and market economies may represent the extremes of centralized and decentralized coordination, as described at the beginning of this subsection.

Delimiting the System from its Environment

The system is defined in terms of the components and activities which it embraces. The definition of activities has been discussed earlier in this chapter, so our present task is to decide what makes a particular component belong to the system or to the environment. To some extent of course, the matter will be determined by the purpose of the study concerned, but not entirely. For example, in a model of the marketing system for a particular class of goods, should we include components representing the various facilitating agencies (banks, transport firms, advertising agencies, etc.) as components of the system or the environment? Or, in a model of a chain organization, what should we do about suppliers who deliver direct to the individual store, or about stores outside the organization who are supplied with goods from its central warehouse?

A general criterion could be to let the *degree of interdependence* between components be the determining factor. But this would not be easy since the definition of interdependence requires so much information about the components' activities. However, there are other intercomponent relations which can be assumed to have some connection with the degree of interdependence and which could perhaps provide a criterion. I would like to discuss two such types of relations: institutional relations and certain characteristics of the goods flows.

Institutional relations, which will be discussed more fully in chapter 4, can be expressed in such terms as "A is owned by B", "A has entered upon a written contract of long-term cooperation with B", etc. Such relations imply that one component can influence the behavior of another as a result of legal or other institutionalized rules. Institutional relations can identify systems such as companies, concerns, cartels, cooperating groups, etc.

Many students of organizations have used institutional relations as criteria for the definition of systems; the boundaries of the system have often been found to correspond to the limits of the company. Several writers, however, have felt that the boundaries should be more conditional upon circumstances and some have included other "participants" (e.g. customers and suppliers) in the organization. See, for example, March & Simon (1958, p. 89 f.), Rhenman (1964a) and Strother (1963).

The subject of marketing management literature is usually the independent

company's choice of marketing policy with distribution channels, competition, demand, etc. treated as external variables. (See, for example, Howard, 1963.) Some writers, however, point out that a fruitful approach to the study of the individual company's various channel problems is to analyse the relations between the company and its institutionally independent distributors with the help of methods and models that are used when studying organizations in a narrower sense. See, for example, Alderson (1957), Berg (1962), Ramström (1967a) and Ridgeway (1957).

The existence of institutional relations can generally be assumed to imply a high degree of interdependence between components as a result of common resources and connections rooted in technological or market processes. It is probably also easier to operationalize institutional relations than other criteria for delimitation. Some disadvantages in the use of institutional relations, at least as the sole criterion, must however be pointed out. Some components falling outside the bounds may for instance be highly interdependent with components inside the institutionally defined system. And if we want to study systems without institutional relations between its components, we must of course seek other criteria.

Another criterion for delimiting systems is geared to the flow of goods.[20] To be included in the system a component must send or receive a certain proportion of its total goods flow to or from another component or group of components in the system.[21]

Let us postulate a set of components at the wholesale level ($w_i \in W$) and a set of components at the retail level ($r_j \in R$). Between each component on the two levels there either exists or does not exist a flow of goods (g_{ij}, which denotes the flow from w_i to r_j). Each of these flows of goods represents a certain proportion of the total out- and inflow of goods for the component concerned. $g_{ij} = a_{ij} \cdot g(w_i)$, where $g(w_i)$ is the total outflow of goods from w_i and a_{ij} the proportion of this flow represented by g_{ij}. Furthermore $g_{ij} = b_{ij} \cdot g(r_j)$, where $g(r_j)$ is the total inflow of goods to r_j and b_{ij} is the proportion of this flow that comes from w_i. We can assume that interdependence between the components w_i and r_j is higher, the greater the proportion of the respective total flows, $g(w_i)$ and $g(r_j)$, that is represented by flows between the components, i.e. the greater the value of a_{ij} and b_{ij}. Further we assume that the system, in accordance with the purpose of the study, embraces the component w_i. We can then include in the system the retail component r_j if

[20] In studies where the purpose is to examine the marketing system for a certain group of merchandise, the criterion must of course always be concerned with the existence of such merchandise in the goods flow to or from a component. (Cf. Skår, 1964, ch. 1.)

[21] Holbaek-Hanssen (1958, ch. 12) has used the relative size of the flow of goods between units at different levels in the distribution channel in an analysis of vertical interdependence between producer and distributor. A similar approach has also been used by Nyström (1967) in his analysis of interactions between sectors in an economy.

b_{ij} is high and a_{ij} is not low. Since the number of components on the retail level is much greater than on the wholesale level, the a-value is set much lower than the b-value. In this way we obtain a subset of the set of retailers which provides a preliminary definition of the system's components at that level. Other wholesale components are included in the system (providing this does not contradict the purpose of the study) if their flow relations with most of the components in the subset of retailers defined above show high values for a and b. If this is the case and, for example, another wholesaler (w_k) is to be included in the system, then the a- and b-values of other retail components will have to be investigated and the preliminary definition of which retailers to include in the system may be extended. We then have to find out whether the new retailers call for the inclusion of further wholesalers, and so on. A definition of the system in accordance with this method, which I will call the *relative flow of goods method*, will of course depend to a large extent on the minimum values chosen for a and b.

In this example interdependence relates chiefly to components on different levels. However, we can assume that a high degree of interdependence between these also means high interdependence between components on the same level. To a great extent these will be using the same suppliers or selling on the same market. For several activities, therefore, similar conditions will obtain (e.g. assortment, conditions of purchase, techniques for transfer of goods and information, market conditions). Changes in the execution of an activity in one retail component can, via an interdependent activity in the wholesale component, affect conditions for an activity in another retail component.[22]

In the present study the choice of criteria for system delimitation is important. First, the value of some integration variables will be directly affected by the way in which the system is defined. Thus, *institutional integration* (as defined in chapter 4) is intimately tied up with *institutional relations*, and *exclusiveness of goods flows* (another integration concept defined in chapter 6) is closely related to the *relative flow of goods method*. Secondly, changes in the size and composition of the system may affect the definition of the efficiency variables and the value of these in a given situation.

[22] If we use the *relative flow of goods method* to define the type of system with which my empirical study is concerned, we find that certain suppliers (in this case of dairy or meat products), despite high b-values, fall outside the system because the relevant a-values are too low. Thus, although dairy products constitute a relatively large proportion of the retailers' purchases, and their purchases are to a large extent made from one supplier, the supplier is not included in the system because the purchases of each of the stores concerned represent such a small proportion of his total sales. On similar grounds very small stores will be excluded from the system.

Environment of the System

"The environment is the set of all objects, a change in whose attributes affects the system and also of those objects whose attributes are changed by the behavior of the system." (Hall & Fagen, 1956, p. 18.)

The environment of the system is divided into sectors with which the system's components *have or could have some sort of relations* (flows or others). The following sectors are distinguished here: *suppliers, service firms, consumers, other customers, competitors, manpower, owners, financing institutions and authorities.* These sectors are made up of components such as households, companies, institutions, etc. Relations can exist also between external components within or between sectors.

The following is a brief description of the sectors and their flow relations with the system. Components in every sector can enjoy two-way information flows with the system, so I will not mention this flow in each separate case. *Suppliers* emit the flows of goods or production factors (excluding manpower) into the system and receive payments from it. *Service firms* (advertising agencies, transport firms, publishers, etc.) emit flows of information or production factors into the system, or into the environment at the request of a component in the system as a substitute for flows from the system, and receive payments from it. *Consumers* receive goods flows from and make payments to the system. *Other customers* receive goods for further handling or resale and make payments to the system. *Competitors* emit goods flows to some of the same components in the environment's consumer or other customers sectors as the system does. *Manpower* consists of individuals that constitute a part of the system's actual or potential manpower resources. This sector emits production factor flows and receives payments. *Owners* consist of present and potential owners. The sector emits and receives payments flows. *Financing institutions* also emit and receive payments flows. *Authorities* are harder to define in terms of flow relations. Their components consist of local or national government agencies. The most usual flow relation involves information, but payments and production factor flows (premises) can also occur.

An object may be represented in the model by components in several sectors. A *supplier,* for example, may reappear in another sector as a *competitor* or *other customer.* A *consumer* or *owner* may also be a component in the *manpower* sector.

The Concept of Efficiency in this Study

In the literature of economic and organization theory, efficiency has been defined in various ways.[28] I shall assume, in the discussion below, that an activity

[28] See e.g. Simon (1957, pp. 179 ff.) where a brief survey of different concepts of efficiency is presented; Ackoff (1962, pp. 34 ff.); Easterfield (1965) and Ruist (1960).

has a *goal,* uses resources (*input*), and leads to a result (*output*). Two main types of definition are as follows:

a) Efficiency is higher, the higher the *degree of goal fulfilment.* In the extreme case neither input nor output are included in the formulation of the goal. This corresponds to the concept of "adequacy" as used by Simon (1957, p. 212) or "effectiveness" according to Easterfield (1965).

b) Efficiency is higher, the higher *the ratio between output and input.* In the extreme case the output-input ratio can be regarded as quite separate from the goal of the activity.

Most efficiency measures are probably a combination of (a) and (b), in that input and/or output variables are included in the goal. A Swedish government committee provides us with an example in its report.

"By efficiency we mean the relation between the effects or results achieved by a government agency as a consequence of its activities (goal fulfilment) and the sacrifices (costs) involved." (SOU, 1967, p. 10, our translation.)

According to the terms of this definition, it will not usually be relevant to compare the efficiency of various action alternatives or systems if their goals are expressed in different variables or different aspiration levels. Either the goals would have to be reformulated to be comparable, or the comparison would have to take into account the differences in goal formulation as well as the degree of goal fulfilment. (Cf. Ahlmann & Rhenman, 1960, p. 51, who distinguish between efficiency with regard to adjustment of goals to environmental changes and efficiency with regard to the attainment of the given goals.)

The efficiency of a marketing system can be judged from various standpoints. For example, the view may he that of the individual component in the system, or of the whole system, or of external components (suppliers, consumers), or of society as a whole. And obviously the chosen standpoint must be declared. Halbert (1965, p. 145) maintains that "an inability to decide whose values should he the controlling ones in terms of which productivity is to be defined" has been holding up progress as regards efficiency measurements in the marketing sector. Cf. also, for instance, Kristensen (1964) for a discussion of how evaluations of the efficiency of the retail trade are affected by the standpoint chosen.

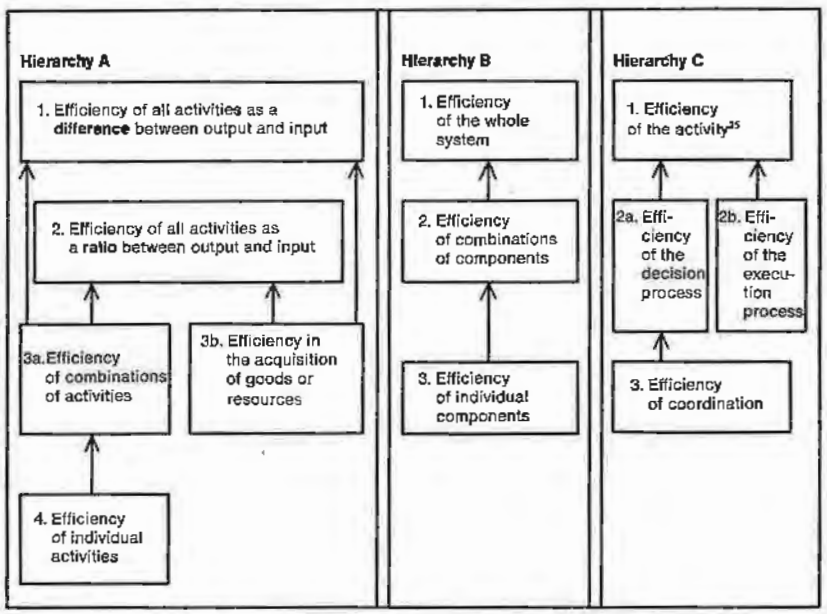
In this study efficiency is viewed from the system's standpoint. Evaluations of efficiency from other standpoints, e.g. the "consumers" or "society", are not included in this study. Nor shall I discuss the effects of the system's activities on external components', for instance suppliers', efficiency. This implies a considerable limitation on the subject covered.

I have chosen as *the overall efficiency measure,* the difference between the total inflow of payments into the system for goods sold, and the total outflow of payments from the system for goods bought and production factors used. (Comparisons between systems according to this criterion are made only if

the systems are of approximately the same size with regard to input or output.) When two systems, alternatives, etc. are compared they should, ideally, be evaluated according to this overall criterion, i.e. we should include all components and activities in the analysis. However, such total analyses nearly always have to be replaced by some kind of partial analysis, in which the efficiency criterion may refer to less than all components, less than all activities, etc. The ranking of the efficiency of systems, alternatives, etc. according to a partial analysis may or may not be the same as the choice that would have been the result of a total analysis. I present here three hierarchies of efficiency criteria. In evaluating action alternatives etc. according to these hierarchies, an alternative with a higher value for a criterion on a higher level in a hierarchy is ranked above an alternative with a higher value for a criterion on a lower level in the same hierarchy. It cannot, of course, be assumed that an increase in efficiency at a lower level in the hierarchy will mean that efficiency at a higher level will also increase. The efficiency criteria, with the exception of the overall efficiency measure, are all defined as a ratio between output and input. The hierarchies refer to how many of the activities (A), how many of the components (B), and how much of the decision-execution process dichotomy (C) are included in the criterion. In figure 2: 5 the hierarchies are shown; the following comments refer to this figure.

Hierarchy A. Definitions of the efficiency criteria are found in schedule

Figure 2: 5 *Hierarchies of Efficiency Criteria*



(See text and for hierarchy A definitions in schedule 2: 1. Numbers indicate level in the hierarchy.)

2: 2. Special cases of criterion 3a arise when the combination of activities includes all the wholesale activities or all the retail activities. For these cases, assuming the output to be given, the inverted value of the efficiency measure is the relative costs of all the wholesale and retail activities respectively.

Efficiency in the acquisition of goods (3b) describes the purchase-price level of goods. The efficiency of activities concerned with purchasing, such as *choice of suppliers* and *ordering,* must in some analyses be evaluated by criterion 3b as well as by criterion 4 or 3a.

Hierarchy C. Efficiency criteria referring to the efficiency of the decision process are defined in chapter 8. "Efficiency of the activity (C.1)" and "Efficiency of the execution process (C.2b)" differ in that in the former the costs of the decision process are included as part of the input.

Any particular analysis of efficiency must use a criterion of efficiency that combines the three hierarchies. The overall efficiency measure referred to earlier in this section can be defined as A.1, B.1, C.1 according to fig. 2: 5. Not all combinations of criteria from the three hierarchies make sense (e.g. A.4, B.3, C.3 cannot be combined for reasons indicated in the footnote to fig. 2: 5).

The problem of defining the time period for the analysis of efficiency will be discussed in chapter 8.

I *postulate* that the efficiency criteria express the *system's goals.* The system's components, including the central component, may well have other goals altogether. The component's search for, and formulation of, goals represents a decision stage independent of the efficiency criteria that I, as an analyst, have postulated in order to be able to make evaluative comparisons of efficiency from the "system's standpoint".[24]

[24] I thus assume that it is possible to speak of a system's goals in the same way as one generally speaks of the goals of an organization, as something that can be different from the goals of the different members of the organization. The goals of the system can be seen as equal to the goals of an "ideal" central component, always preferring action alternatives that raise the efficiency of the system as a whole regardless of the effects on efficiency in the different parts of the system. However, I do not postulate that the central components in the model are "ideal" in this way.

[25] Efficiency of coordination can refer to single activities only when the same retail or wholesale activity is carried out by several components. Therefore C. 1 should read "efficiency of the activities" when C. 3 is involved.

Schedule 2: 2 *Definition of the Efficiency Criteria in Hierarchy A in Figure 2: 5*
(The relation between output and input is a *ratio* in all cases except that of level 1.)

Level	*Designation*	*Description of output and input*
4	Efficiency of individual activities	*Output:* One of the definitions of the activity's output, often a flow quantity, appearing in appendix 2: 1. *Input:* Inflow of production factors used in the activity. (It is assumed here and below that all production factor flows can be expressed in terms of money.)
3a	Efficiency of combinations of activities	*Output:* A definition of output common to the activities (often goods flows valued in money terms). *Input:* Inflow of the production factors used in the activities.
3b	Efficiency in the acquisition of goods	*Output:* Inflow (NB!) of goods, valued in terms of physical quantities, from the environment to the system's central components. *Input:* Outflow of payments, corresponding to these goods. *Comments:* 1) This criterion must be estimated as an index number. 2) If a greater proportion of the goods pass through a central component in one of the compared situations, the input quantity is adjusted by adding the extra costs in CC. 3) If purchase conditions etc. are different in the compared situations, the input quantity is adjusted accordingly.
3b	Efficiency in the acquisition of resources	*Output:* Inflow (NB!) of a certain type of production factors (or capital) in accordance with a combined qualitative and quantitative evaluation (e.g. number of good store sites and number of inferior store sites acquired). *Input:* Outflow of payments to the components outside the system which have emitted the flows of production factors or payments (capital).
2	Efficiency of all activities as a *ratio* between output and input	*Output:* Inflow (NB!) of payments to the system for goods flows emitted from the system. *Input:* Inflow of production factors used for all activities and the outflow of payments for incoming goods flows. *Comment:* If, in the compared systems, different portions of the inflow of goods to RCs come from suppliers outside the system, or different portions of the outflow of goods from CC go to buyers outside the system, this will have to be considered when using this efficiency criterion since the "weight" of the wholesale activities in the efficiency measures will be different.
1	Efficiency of all activities as a *difference* between output and input	The relation here is the *difference* between output and input defined as on level 2. *Comment:* When used in comparisons between situations involving different components or systems, these must be of approximately the same size with regard to input or output.

Chapter 3
The Integration Concept in Marketing Literature

In marketing literature the concept of integration is imprecise and lacking in clarity. Also it often varies from author to author. This obviously creates difficulties for those seeking to study integration and its relations with efficiency and explains why I have devoted so much space below to the development of concepts.

In certain technical fields—mathematics, psychology, organization theory, economics, etc.—the term *integration* is sometimes used in specific ways. This study falls within the scope of marketing. Although, like most other studies of social phenomena, it deals with problems that are of an inherently multidisciplinary nature, the survey in this chapter is almost exclusively based on marketing literature. I shall first quote several definitions and then analyse them, bearing in mind the model of a marketing system in the previous chapter.

I hope to show the great need for developing concepts and thus to justify my own concentration on this aspect of the subject. Furthermore the chapter is intended as a base for the link-up in chapters 4—6 with current concepts.

Definitions of Integration

The general meaning of *integration* can be expressed by the definitions provided in *Webster's New International Dictionary* (1952, p. 1290). Integration is there defined as:

1) Act or process of integrating; spec. act or process of making whole or entire.
   (2. ff. embraces special definitions.)

The transitive verb *to integrate* is defined as follows:

1) To form into one whole; to make entire; to complete; to round out; to perfect.
2) To unite (parts or elements), so as to form a whole; also to unite (a part or element) with something else, esp. something more inclusive.
   (3 ff. embraces special definitions.)

The adjective *integrated* is defined as:

> Composed of separate parts which make a unity; composite of or pert. to a whole so constituted; made complete, whole or perfect.

Thus it seems that, commonly, integration is a substantive form of the verb *to integrate,* designating an action that changes the characteristics of a system in ways that can be described by the adjective *integrated.* By means of integration the separate parts of the system are united, and the system functions as a whole. Special uses in fields such as mathematics, biology, sociology, psychology, business administration and economics are in most cases clearly related to common usage.[1]

When we turn to integration specifically in marketing systems, no generally accepted definition comes to light.[2] Nearly every writer on integration in marketing literature has his own definition, differing in some degree from those of other writers; some do not define the concept at all. The list of ten definitions below, chosen from an even larger number of works, provides a fairly representative picture of the various kinds of concept that abound. It makes no claim to be exhaustive.

Ten definitions[3]

A. "(Thus) a firm is called vertically integrated when it transmits from one of its departments to another a good or service which could, without major adaptation, be *sold in the market*" (Adelman, 1949, p. 27).

B. "In this sense integration is *the summation of all the ties which relate the ultimate consumer to the resources* that are to be employed in serving him." "... I am using the term integration *without necessarily assuming ownership,* mergers, nor even compulsion, legal or otherwise" (Arthur, 1961, p. 418).

C. Integration embraces "the various *means of achieving coordination for the optimal* operation of two activities". The degree of integration "usually refers to *the extent to which direct management is utilized to supplement* or in the extreme replace *the price mechanism*". "The degree to which coordination in two vertically related activities is achieved through joint management is measured by *the number of decisions* in one or both activities that are under joint control of the respective managerial groups."

The author speaks of a *continuum of different degrees of integration*

[1] See e.g. the various special definitions in *Webster's New International Dictionary* (1952, p. 1290); Balassa (1961) on economic integration between countries and between regions; Lawrence & Lorsch (1967) and Ramström (1967, pp. 219 ff.), on integration within organizations.

[2] In *Marketing Definitions. A Glossary of Marketing Terms,* issued by the American Marketing Association in 1960, for instance, there is no mention of *integration, to integrate* or *integrated,* either alone or in combination with other terms.

[3] The definitions are arranged alphabetically according to author's name. My italics. Source supplied after each definition.

and distinguishes between the degree of integration itself and the type of institutional instruments which can influence the degree of integration achieved. He points out that "full ownership of two vertically adjacent activities is not a necessary condition for full integration". (Blaich, 1961, pp. 8 f., 13.)

D. *Vertical* integration is defined as "that type of organization that comes into existence when *two or more successive stages* of production and/or distribution of a product are combined under the same control".

Horizontal integration occurs when ". . . two or more similar concerns are combined to perform *the same functions* in the same stage of distribution or production".

"Fully integrated" means that "a firm has extended its activities to include some equipment or some type of organizational setup in all the production and distribution stages that are normally included in the industry, in which the firm is operating". Other types of "vertical integration" are then described as "partially integrated". (Cole, 1952, pp. 99, 105.)

E. "By integration we mean a number of different *forms of cooperation.*" The authors then define such concepts as multiples, voluntary chains etc. A passage which follows seems to suggest that integration nevertheless involves more than a set of institutional characteristics: "Integration usually seems most advanced in ordinary chain organizations, least advanced in buying groups . . ." "Most chain store systems are probably centrally controlled . . ." Thus the degree of integration seems to be equated with the degree of *centralized decision making.*

Later, to show that integration can be far advanced in voluntary chains, the authors refer to uniformity in appearance, assortment, pricing policy etc., thus implying that their concept of integration includes *homogeneity* in the execution of marketing activities. (Fog & Rasmussen, 1965, pp. 502, 503, our translation.)

F. "*Vertical* integration refers to the *degree of interdependency* between wholesaler and retailer units. *Horizontal* integration is the term applied to the existence of *inter-unit standardization* among retail units." Interunit standardization refers to structural attributes such as assortment, store planning and sales policy.

The author also speaks of "an integration continuum" in which it is possible to determine "the level of integration". Different parts of this continuum are designated "wholly-integrated", "quasi-integrated" and "non-integrated". (Hansen, 1965, pp. 111, 112, 114.)

G. "A *horizontally* integrated firm *controls* a number of *units* all handling similar commodities on one and the same *level* of the production or marketing process and its management controls a *unified profit policy.*"

"A *vertically* integrated firm controls a number of different operations in the production and/or marketing of similar commodities on successive levels, and its management pursues a unified profit policy."

The author defines *partial integration* as techniques used to obtain results which in some respects resemble those obtained by "fullfledged integration". However, they require "a more liberal interpretation of the concepts of 'single management control' and 'pursuance of a unified profit policy' ". Examples of partial vertical integration are sales promotion by producers, prepackaging, storing of branded commodities by producers and exclusive dealer contracts. Partial horizontal integration is represented by cartels, marketing cooperatives, industry advertising, etc. (Hirsch, 1950, pp. 160, 161, 164, 165.)

H. "By horizontal integration is meant that a firm increases in size *by selling an increased volume* of its existing product lines." "The extent to which a firm is horizontally integrated is *one measure of its absolute size.*"

"By vertical integration is meant the *extension of control* over two or more *successive processes* of production by a single firm or jointly by several firms." "*The extreme or highest* degree of vertical integration involves such extension of control by means of *ownership* . . ." "An alternative form of vertical integration is the extension of control over successive processes, through *contractual arrangements* or *informal agreements.* In this case 'certain production and marketing activities of firms, which otherwise would make decisions independently, *become integrated* under a *single or joint* decision-making unit'."

"An indication of the degree of integration in an affiliated group is *the extent of centralized control* of certain important merchandising *decisions.*" (Mueller & Garoian, 1961, pp. 18, 68, 110.)

I. "The forms of distribution occurring *alongside the classical distribution channel* are characterized by what is known as integration, i.e. some or all the functions of the intermediate levels are taken over by the foregoing or succeeding level.

"In *full integration* one or more of the independent intermediate levels are eliminated, and all the functions of these levels are taken over by the foregoing or succeeding levels.

"In *partial integration* a foregoing or a succeeding level takes over some of the functions that were carried out by independent intermediaries, which however remain and still carry out some functions." The author compares the central warehouse of a corporate chain and a retailer-controlled wholesale firm. In his opinion the latter is a similar but less advanced type of integration. (af Trolle, 1963, pp. 55, 56, our translation.)

J. "Integration is a process of reaching out horizontally *to enlarge the span of ownership* or vertically *to reduce the number of successive ownerships.*"

> Commenting on the degree of integration, the authors claim that a comparison between two parts of a marketing institution, or the same part on two separate occasions, will reveal clear differences. But there is no absolute point at which we can say that an organization has become integrated. These authors count voluntary chains and other loose forms of cooperation as examples of *limited vertical integration* by contract. (Vaile, Grether & Cox, 1952, pp. 154, 208.)

Comments on the Definitions

How do these definitions allow for (a) components, (b) flows between components, (c) other relations between components, (d) level of activities, (e) division of activities into decision and execution processes, (f) degree of integration, and (g) integration as a state of the system or as a change in such a state? The first five of these headings will be recognized from the model outlined in chapter 2.

Components

The authors who mention components (as defined in our model) refer variously to *department* (definition *A* above), *managerial group* (*C*), *stage* of production and/or distribution (*D*), *concern* (*D*), *unit* (*F, G*), *firm* (*H*), *decision-making unit* (*H*), *level* in the distribution channel (*I*).

An example of the confusion that can arise from this variety of definitions is the following. Assume that a company increases its sales in a component that it already owns; according to (*H*) this is an expression of horizontal integration; according to (*D*) it is not. If however the increase is the result of the purchase of a component previously owned by another company, this is integration also according to (*D*).

Flows

Flows are included explicitly in only a few definitions. According to (*A*), integration implies a potential or actual goods flow between system and environment, of the same type as the internal goods flow.

The "ties" in definition (*B*) may perhaps refer to different kinds of flow. In definition (*H*) horizontal integration is linked to the size of the output from the system. Some of the definitions (*E, G, H*) refer implicity to flows of information, in passages concerned with the centralized control of certain decisions. Since flows affect—and are affected by—attributes of the activities (decision and/or execution processes), definitions that refer to activities can also be said to relate, implicitly and indirectly, to flows. This applies to (*C—I*).

Other Relations Between Components

Institutional relations feature importantly in most of the definitions. Integration (without the modifications "quasi" or "partial") occurs within companies or between jointly owned groups according to (*A, G, H, J*). In (*B, C, F*) integration is defined without any reference to institutional relations. The degree of integration is defined wholly or partly in terms of institutional relations in (*G, H, J*), where ownership is said to induce a higher degree of integration than looser cooperative arrangements. In (*C*) it is explicitly stated that ownership is not a necessary condition of full integration. In (*D, E, G, H*) some connection between institutional relations and *control* or *centralization* seems to be assumed.

Other relations mentioned in the definitions are the *degree of interdependence* between components (*F*), and the *uniformity* in the way a particular individual activity is carried out (*E, F*).

Level of Activities

It is generally assumed that vertical integration refers to relations between components or activities at different levels in the marketing process, and horizontal integration to relations between components or activities at the same level. In (*J*) what we call level refers to an ownership in a number of "successive" ownerships, in (*I*) it refers to a level in the "classical" distribution channel, while in (*A*) it refers to the existence of a market for the good in its different stages of completion.

According to definition (*C*), as it is further developed in Blaich (1961, p. 2), an activity involves some not inconsiderable change in the attributes of a good. In other words, each activity (defined in this way) constitutes a level. It will be easier to delineate production activities in this way. Marketing activities, on the other hand, refer to imprecise, multidimensional changes in the attributes of goods (p. 12).

As the following example will show it is sometimes very difficult, with the given definitions, to decide whether integration is vertical or horizontal. Frequently, in fact, the distinction seems meaningless.

Let us assume that consumer-oriented advertising is classified as a retail activity. The advertising activity of a system can be centralized in many ways Compare the following with a situation in which each retail unit carries out its own advertising.

a) The retail units agree on a common advertising program.
b) Assuming that the retail units, in both the compared cases, are part of a chain organization; advertising is arranged centrally by the headquarters of the chain in case (b).
c) A wholesale unit, owned by the retailers, runs a common advertising program.

d) An independent wholesale company is responsible for advertising under contract to the retailers.

Do these cases represent horizontal or vertical integration according to the various definitions?

Case (*a*) represents horizontal integration according to (*D, G*), no change in integration according to (*H, J*) and, probably, an increase in horizontal integration according to (*F*). *Case* (*b*) involves no change in horizontal integration according to (*D, G, H, J*) and, probably, an increase in horizontal integration according to (*F*). *Case* (*c*) implies a change in vertical and/or horizontal integration according to (*D, G*) and an indirect such change according to (*F*). According to (*H, J*) it would represent a case of vertical integration. *Case* (*d*) would be defined as vertical integration according to (*D, G, H, J*) and, probably, an increase in both horizontal and vertical integration according to (*F*).

Decision and Execution Processes

Some of the definitions imply an awareness of the decision-execution dichotomy (*C, D, E, G, H*). In these cases integration is closely linked to the decision process. However, various basic concepts such as "control", "independent decision", "direct management", "decision-making unit", "number of decisions", etc. are simply not defined. Instead the reader is often referred to some connection between these concepts and the institutional setup. The fact that the decision process of one activity may be distributed among several components is ignored. Moreover, in all the definitions quoted, except (*G*), it is implied that "control" is the same as full "control" of the activity concerned. Centralization of the decision process refers not to decisions for the individual activities but, for example, to the number of decisions under joint control (*C*), or the number of activities controlled by central decision-making (implicit in *D*).

Another problem arises from the fact that the decision and execution processes may be localized in different components. Let us assume that the execution of *price marking* is transferred to a wholesale unit but the retailer decides the price and the price marking technique. According to (*D*) vertical integration has increased, because the wholesale unit has acquired some equipment for carrying out a retail activity, but not according to (*G, H*).

Degree of Integration

Degrees of integration are indicated in all the definitions except (*A, B*). Such terms as "partial", "quasi" or "limited" integration often occur.

The dimensions in which the degree of integration is more, or less, clearly expressed vary considerably. The following are some examples.

Number of *decisions* that are under joint control (*C*).

Number of *stages* in a certain limited production/marketing process embraced by a company's activities (*D*).

Uniformity between components in their execution of activities (*E, F*).

Institutional relations, where "company/ownership" represents a higher degree than "contractual agreements" (*E, F, G, H, J*).

Degree of interdependence between components on different levels (*F*).

Sales volume of the system (*H*).

The extent of centralized control of certain important merchandising decisions (*H*).

Number of activities, which are carried out by components *on another level* (*I*).

Integration as an Expression of State or Change

Whether integration is to describe the state of a system or a change in the state of a system is an important decision when formulating the concept. If, for example, a company buys another company, integration can refer either to the actual purchase or the state of the system before (*or* after) the purchase.

In Webster's definition (cited on p. 37) *integration* is used to describe a change. It is used in this way also in (*H, J*), although the last sentences in these definitions seem to imply that the concept also describes a state. In all other definitions above it describes a state. The integration concepts which will be developed in chapters 4—6 below will also describe *states.*

On the Need for a Development of Concepts

We have just seen what a welter of definitions the integration concept has called forth. This might not have been so remarkable, had these definitions been used for studies of different types of systems or problems, but in fact most of the definitions have been quoted from works dealing wholly or in part with the very specific problem facing us here, namely integration and the relation between integration and efficiency in marketing systems consisting of retail and wholesale units. Despite differences in their definitions of integration, there are many similarities in the way the various authors analyse the relation between integration and efficiency. We can therefore suppose that the various concepts do in fact have some points of contact. Remember, for instance, that in (*E*) integration is geared to three separate phenomena—institutional relations, centralized decision making and uniformity in the execution of activities, without any explicit distinction being made between them.

The integration concept has been widely used to describe such complex phenomena that some sort of subdivision seems justified. The confusion we have illustrated above only serves to support this claim. I feel the need is urgent

to develop a set of integration concepts and to analyse the relationships between them. In developing such a system of concepts it is naturally important to bear in mind how the concepts are to be used. At the same time it is important to link up with previous usage.

We are seeking integration concepts that will lend themselves well to analyses of the efficiency of marketing systems. In this respect the concepts discussed in the previous sector have certain drawbacks.

a) In most of the definitions *the emphasis is on institutional relations.* These probably only influence the various criteria of efficiency indirectly, in that they affect the conditions for the centralization of decision making. It is therefore important to create integration concepts that describe characteristics of the decision and execution processes since these variables can be assumed to affect efficiency more directly.

b) Most of the definitions quoted imply that *the integration variable is a discrete variable for which only a few values are possible.* In this study one of my main arguments is that it should be possible to allot a large number of values between 0 and 1 to the various integration variables, because I assume that even relatively small changes can affect efficiency.

c) None of the definitions say very much about *haw integration is to be measured* (and further perusal of the texts in which they appear reveals little more). This is less serious in the case of institutional relations and more so with regard to integration concepts referring to decision and execution processes, because institutional relations are easier to operationalize.

In the three following chapters I shall develop some relevant concepts. In doing so I shall distinguish between *three main types of integration: institutional integration, decision integration and execution integration.*

Chapter 4
Institutional Integration. Introduction to the Empirical Study

In this chapter I shall present the concept of institutional integration and report on measurements of this variable in four systems. In this chapter, and in the related appendices, I shall also present the scope and method of the empirical study.

Institutional Integration—a Concept

Institutional relations are legal relations, or relations in some similar way institutionalized, between components. The following are the four such relations allowed for in our model. A and B are two components.

a) A is *owned by* B
b) A is a *part of the same legal entity* as B
c) A has *signed a written contract for long-term cooperation* with B
d) A is *represented on some statutory body* of B.

The terms *written* and *long-term* in (c) and *statutory* in (d) link up with common usage of the term *institutionalized*.

A component need not be institutionally related to any other component; it may be related in one or more ways to one or more components inside or outside the system. *B* and *C* may both share in the ownership of *A; A* may have entered into contracts with *D* and *E*, etc. Institutional relations affect the amount of formal, legal power of one component to influence the behavior of another. The *strength* of the institutional relations is said to be greater, the greater this power. For example, if *A* is owned solely by *B*, then *B* has various legal means of persuading *A* to act in certain ways. If *B* is simply represented on the board of *A*, or shares ownership of *A* with *C* and *D*, I postulate that the legal base for influencing *A's* behavior will not be so strong.

Institutional integration between two components is defined in terms of certain attributes of the institutional relations. If the legal power enjoyed by one component over the behavior of another increases, we can say that the institutional relation has become stronger and that institutional integration has increased. A large number of values could be attached to institutional integration, since the attributes of the institutional relations can be combined in so many different ways.

In this study, however, I identify three classes only: *full, partial* and *no institutional integration*. A more detailed classification would involve us in the complex problem of ranking a great many possible combinations of institutional relations according to the legal power they bestow. Since institutional integration is not of prime importance to my argument, there is no need to consider these problems here.

Full institutional integration or *FII*, exists between two components A and B if A is *owned solely* by B *and* A is *part of the same legal entity* as B *and of no other*.

Partial institutional integration or *PII* is said to exist between two components if there is *at least one institutional relation* between them but requirements of full integration are not fulfilled. *FII* represents a greater degree of institutional integration than *PII*, because I assume that full ownership within the same legal entity provides the greatest possible legal power to control the behavior of another component, within the present framework of institutional relations.

Finally, *no institutional integration* or *NII* implies *a total absence* of institutional relations between two components.

In this study I am chiefly interested in integration between central and retail components; integration between central components on different levels or between components on the same level is of less immediate concern. I thus let the strongest institutional relations between each retail component (*RC*) and any of the system's central components (*CC*) be the basis for classifying institutional integration for the system as a whole.

If the relations are not equal for all RCs, the system is classified in accordance with the degree of integration revealed for at least three quarters of them. If no single degree of integration receives such a majority, the institutional integration is classified as partial. Thus *PII* is also used to describe systems whose institutional relations are comparatively heterogeneous. *FII* and *NII* are more clear-cut, which is quite natural since they represents the extreme cases (greatest and least possible legal power).

Two types of *PII*-systems can be distinguished: (a) *retailer-sponsored partial institutional integration*, or *PII-R*, where at least half of all the retail components are owners of at least one of the central components, and (b) *wholesaler-sponsored partial institutional integration*, or *PII-W*, where no retail components (or less than half of them) own any of the central components.

Aim and Scope of the Empirical Study

The aim of the empirical study can be formulated as follows.

a) To measure and, between systems with different degrees of institutional integration, to compare the values of the integration variables.

b) To provide grounds for evaluating the relevance of the integration concepts and, in an inductive way, to get ideas for the analysis of the relations between integration variables and between these variables and efficiency.

Before I undertook the empirical study, a preliminary model of the marketing system (which corresponds in the main to the model introduced in chapter 2), and a preliminary formulation of the various integration concepts were developed. This determined to a considerable extent what material was

Schedule 4: 1. *Systems in the Empirical Study*

System number	Extent and organizational membership	Institutional integration	Code
1	Regional consumers' cooperative society	Full institutional integration	FII
2	District in the ICA-group. (ICA is a nation-wide retailers' cooperative organization which on the whnlesale level consists of three wholesale companies)	Partial institutional integration — Retailer-sponsored	PII-R
3	Regional part of a voluntary chain sponsored by wholesalers in the ASK-group. (ASK is a joint purchasing organization for independent grocery wholesalers)	Partial institutional integration — Wholesaler-sponsored	PII-W
4	Independent wholesaler in the ASK group and its retailer customers	No institutional integratinn	NII

collected in the empirical study and what methods were used (see appendices 4: 1—4: 3).

The aim of the study was purposely formulated in rather general terms. Not much is known at present about integration and efficiency in marketing systems. I therefore considered it an advantage at this early stage not to restrict an empirical study to narrowly delineated problems.

Four systems have been chosen for study according to certain criteria, without any probability selection being involved. Among these criteria, which are reported in detail in appendix 4: 1, was the requirement that each chosen system should be different with regard to institutional integration. In that way I hoped to be able to make interesting comparisons of differences and similarities for the other integration variables between systems with varying degrees of integration, according to the most commonly used integration concept (i.e. institutional integration). I therefore used institutional relations as

Schedule 4: 2 *Definition of Components in the Various Systems*

Code[a]	System 1=FFI	Code	System 2=PII-R	Code	System 3=PII-W	Code	System 4=NII
RC_1	*Foodstore* (or food dept. in dept. store) owned by CC_{11}[b]	RC_2	*Foodstore* which is part owner of CC_{22} and located in the district where CC_{21} carries on wholesale activities	RC_3	*Foodstore* which is a member of the regional part P of voluntary chain R. P is sponsored by CC_{31}	RC_4	*Foodstore* with CC_{41} as chief supplier of groceries, with at least 50,000 Sw. crowns worth of purchases from CC_{41} a year.
CC_{11}	*Consumers' co-operative society X* as legal entity, its head office, management, committees, and the statutory organs of the association.	CC_{21}	*Retailer-owned wholesale company Z's distribution center* U, Incl. committees and statutory organs.	CC_{31}	*Wholesale company S*, incl. *the voluntary chain P*, as a legal entity, together with its committees and statutory organs.	CC_{41}	*Wholesale company T*, incl. advertizing committee in which a number of RC_4s participate.
CC_{12}	*Regional warehouse Y*, for wholesale activities in the region of which CC_{11} is a part. Incl. premises used for marketing perishables to the CC_{11} area and the committees connected with the regional warehouse.	CC_{22}	*Wholesale company Z* as a legal entity, its head office, committees, and various premises for regional distribution of bread and goods from central warehouse. Incl. committees and statutory organs.	CC_{32}	*National organization of the voluntary chain R*, including office, committees and statutory organs.	CC_{42}	*Group V* of wholesale companies of which CC_{41} is a part.
CC_{13}	*KF, The Cooperative Union and Wholesale Society* incl. committees, statutory organs and units for nation-wide marketing activities.	CC_{23}	*ICA's central organization*, committees, statutory organs and units for nation-wide marketing activities.	CC_{33}	*ASK*, economic society incl. office, committees, statutory organs and units for nation-wide marketing activities.	CC_{43}	*ASK*, economic society. Same as CC_{33}.

[a] The first figure indicates the system number. The second figure indicates level in the hierarchy.

[b] Foodstores are stores in which food answer for more than 50 % of sales.

Schedule 4: 3 *Components of the Large Systems*

System	Components included
FII	All components associated with KF or consumers' co-operative societies affiliated to KF, which take part in food marketing activities (excl. restaurants etc.)
PII-R	All components associated with ICA, which take part in food marketing activities (excl. restaurants etc.)
PII-W	All components affiliated to the national voluntary chain R, which take part in marketing activities; and ASK.
NII	Wholesalers in group V and those of their customers who can be characterized in the same terms as RC_4 (see schedule 4: 2); and ASK.

Table 4: 1 *Size of the Systems in 1965*

Number of Retail Components
Sales from Components on Different Levels, amount given in millions of Swedish Crowns, excluding sales tax.

System:	FII	PII-R	PII-W	NII
Number of RCs	47	199	107	89
Sales from these RCs	64	160	116	63
Total sales from:				
CC_{i1}	84[4]	66	92	26
CC_{i2}	179	827	c. 250	c. 50—60
CC_{i3}[5]	1,820	1,570	1,380	1,380

[4] This figure indicates total sales from all stores owned by CC_{i1} (i.e. including stores other than foodstores). CC_{i1} does not perform wholesale activities.
[5] All sales from wholesale units associated with ICA and ASK and sales from regional warehouses and regional perishable producers in KF. The sources of the figures at the CC_{i3}-level are the annual reports of the organizations.

criteria for delimiting the systems, with one exception.[1] In the system without any institutional relations between central and retail components, I have used a method similar to the *relative flow of goods method,* discussed earlier on p. 31. Thus retail units using the already chosen wholesale unit as main supplier of groceries have been included in the system, if their total purchases from the wholesale unit exceeded a certain amount.

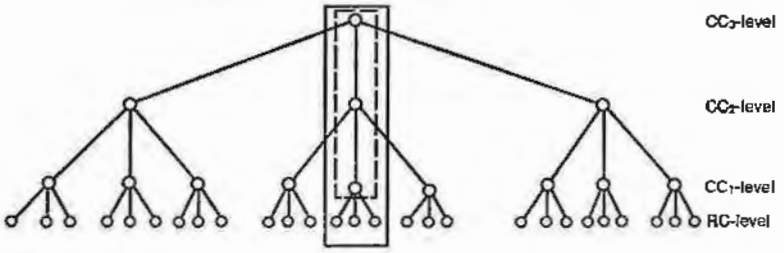
Conditions reported refer to 1966 with the exception that most figures refer to 1965.

Each of the systems is a subsystem of a *large system.* The hierarchical struc-

[1] My reliance on institutional relations in this study does not indicate any general preference for this criterion in setting the boundaries of a system. Cf. the discussion on pp. 29 ff.

ture of the *large systems* is based on the existence of institutional relations and/or goods flow relations between components at different levels. Figure 4: 1 illustrates a *large system* of which one of our four systems is a part. At certain stages of my argument I change altitude in that the central components on different levels are counted together as a single component. (This applies for instance to parts of chapter 5.) Schedules 4: 1—4: 3 and table 4: 1 describe the systems in greater detail.

Figure 4: 1 *A Studied System as Subsystem in a Large System*



O = components
Lines between components indicate the existence of institutional and/or goods flow relations.
Solid thick lines indicate the boundaries of the studied system.
Broken lines indicate that in certain cases the central components on different levels have been combined into *one* component, i.e. the altitude has been increased.

Table 4: 2 illustrates some of the population conditions in areas where the RCs and lowest-level CCs function. The areas containing the PII systems show a higher growth rate and higher proportion of population centers than the other areas. In the NII area, population is on the decrease; the proportion of population centers is also the lowest.

Table 4: 2 *Population Conditions in the Relevant Areas, 1965*[6]

	FII	PII-R	PII-W	NII
Population in millions, approx.	1/4	1/4	1	1/4
Proportion of pop.centers[7], approx.	1/2	2/3	1	1/4
Percentage change in population 1962—65, approx.	+ 1	+ 4	+ 4	— 2

[6] Source: Statistisk Årsbok 1963 and 1966, table 13.
[7] Population centers mean here towns and other urban districts.

Institutional Integration in the Systems Studied

The institutional relations between component pairs have been established by means of interviews and by a study of existing agreements and charters.

Schedule 4: 4 *Institutional Relations Between Component Pairs in the Systems*

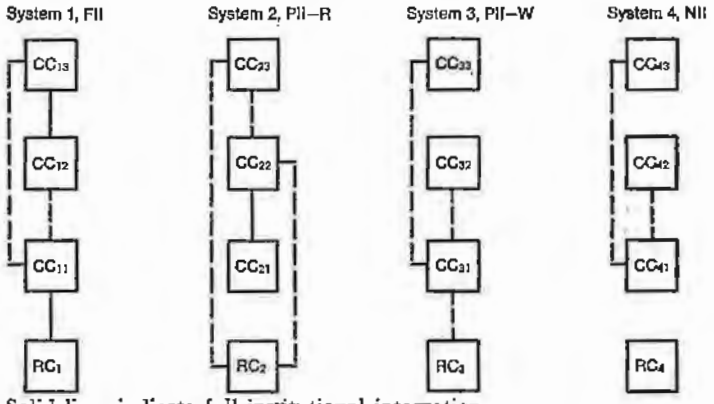
Component pairs (i indicates system number)	System 1, FII	System 2, PII-R	System 3, PII-W	System 4, NII
RC_1/CC_{11}	CC_{11} is an economic society. All RC_1s are included in their entirety in this legal entity. They are also owned entirely by CC_{11}.	None	RC_3 and CC_{31} are members of the voluntary chain P which is an economic society. RC_3 and CC_{31} are, however, independent legal entities. A charter and constitution have been signed by RC_3 and CC_{31}, whereby they have entered upon an agreement to cooperate.	None
RC_1/CC_{12}	None	RC_2 owns shares in CC_{22}. All the RC_2s have signed the ICA-charter which means that they have entered into a contract. RC_2 is an independent legal entity. CC_{22} is part-owner of some RC_2s and in exceptional cases owns an entire RC_2.	None	None
RC_1/CC_{13}	None	RC_2 is a member of CC_{22} and has also entered into a contract with CC_{22} by signing the ICA-charter.	None	None

Schedule 4: 4 (cont.)

Component pairs (i indicates system number)	System 1, FII	System 2, PII-R	System 3, PII-W	System 4, NII
CC_{i1}/CC_{i2}	CC_{i1} is affiliated to CC_{i2} which means that CC_{i1} will be represented on CC_{i2}'s statutory committees.	CC_{21} is in its entirety part of the legal entity CC_{22}. CC_{22} owns CC_{21}	CC_{32} is a joint stock company in which CC_{31} and other wholesalers sponsoring regional parts of the voluntary chain R are part-owners. CC_{31} and CC_{32} are separate legal entities.	CC_{41}, together with some other wholesale companies, forms a group based on joint proprietary interest. CC_{41} and CC_{42} are separate legal entities.
CC_{i1}/CC_{i3}	CC_{i1} is affiliated to CC_{i3} and is part-owner of CC_{i3}. CC_{i1} is represented on certain statutory committees and has signed certain written contracts with CC_{i3}.	None	CC_{31} is part-owner of CC_{33}. CC_{31} and CC_{33} are separate legal entities.	CC_{41} is part-owner of CC_{43}. CC_{41} and CC_{43} are separate legal entities.
CC_{i2}/CC_{i3}	CC_{i3} is wholly owned by CC_{i2}; it forms part of the legal entity CC_{i2}.	CC_{22} is a member of CC_{23}, which means that CC_{22} owns shares in CC_{23} and has signed the ICA-charter. CC_{22} will be represented on certain committees in CC_{23}. There is also a consortial agreement between CC_{22} and CC_{23} which gives CC_{23} authority to make certain decisions binding on CC_{22}.	None	None

The relations are described in schedule 4: 4 and in the accompanying comments. The resulting institutional integration between component pairs is illustrated below in figure 4: 2. The degree of integration in the systems as a whole has already been indicated in schedule 4: 1.

Figure 4: 2 *Institutional Integration between Components in the Studied Systems* (according to schedule 4: 4)



Solid lines indicate full institutional integration
Broken lines indicate partial institutional integration
Absence of any line indicates no institutional integration

Comments on Schedule 4: 4

FII

The written contracts existing between CC_{11} and CC_{13} concern CC_{11}'s association with the Swedish Auxiliary Association (*SHF*), the Cooperative Pensions Foundation, the Department Store Association, Domus and the Auditing Department of KF.

As a result of the association with *SHF*, CC_{11}'s right of decision is formally restricted with respect to establishing new retail units and capital formation. Such decisions depend on agreement between the CC_{11} and *SHF*. According to the *SHF* agreement, *SHF* owns all assets and liabilities except real estate and fixtures, which it rents from CC_{11}. CC_{11}'s connection with *SHF* has historical roots: the small societies with a poor economic standing that joined together to create the regional society CC_{11}, were already associated with *SHF*.

Association with the *Cooperative Pensions Foundation* provides rules regarding employees' pension rights.

The *Domus Agreement* provides formal rules for allocating the right of decision as between CC_{13} and CC_{11} with regard to one RC_1 (a department store).

Association with CC_{13}'s *Auditing Department* implies formal obligations to supply information to CC_{13}.

The *Charter of the Cooperative Union and Wholesale Society* is mainly concerned with general objectives of the cooperative movement and with rules for the parliamentary organization.

PII—R

The following is the main content of the ICA Charter:

1) The general aim of the system is to assure the present and future development of RC by means of efficient marketing, through organized economic cooperation between CC and RC.
2) The *necessary conditions of membership for RC are:*
   a) The principles of the charter shall be followed in the running of operations (as stated below under point 3).
   b) Decisions made by CC on a basis of the principles laid down by the ICA Central Assembly shall be followed. (The Assembly is part of CC_{23}.)
   c) Part ownership of CC and capital formation by means of withheld bonus.
   d) A certain standard in rnnning a well-kept store.
   e) Purchases from CC must constitute at least 20 % of RC sales.
   f) RC must display the ICA emblem.
3) *Principles for deciding RC activities:*
   a) Most *purchases* of merchandise groups carried by CC are to be made from CC.
   b) *Order routine* shall follow the rules laid down by CC with regard to timing and techniques.
   c) *Sales promotion* activities planned by CC shall be carried out.
   d) RC shall show active interest in advice from CC *consultants* about various retailing problems.
   e) RC shall supply CC with *information* about annual sales, budget for coming year's purchases from CC, establishment plans and changes in the number and identity of stores in the local area.
4) *Central components* are provided with general guiding principles regarding assortment policy, consultant and training activities, establishment of new units and the provision of information to RCs.
5) Rules for the *parliamentary organ's* composition and working methods are laid down.
6) A *consortial agreement* between CC_{23} and CC_{22} is stipulated.
7) A *breach of the charter* by RC may result in loss of membership.

PII—W

ASK's charter deals only with CC_{33}'s general objectives, rules for membership of CC_{33}, the parliamentary organization and rules for payments between CC_{33} and CC_{31}. No principles for CC_{31}'s wholesale activities are included.

The *charter of the voluntary chain* describes the *objectives of the chain and the obligations* of CC_{31} in its relations with RC_3, as well as RC_3's obligations as a member of the system.

CC_{31} shall
   a) act as coordinating agent in the system and supply some of the necessary resources for the chain's activities,
   b) solve RC_3's purchasing problems both for CC_{31}'s assortment and for other groups of merchandise,
   c) plan and carry out sales promotion activities,
   d) promote efficiency in store operatinns by meaus of training, pooling and exchanging of experiences, holding a watching brief on possible store sites etc.

RC_3 shall
   a) loyally follow the principles laid down by CC_{31}'s parliamentary body,
   b) concentrate its purchases to CC_{31},
   c) follow up sales promotion activities decided by CC_{31},
   d) strive for greater efficiency in its operations,

e) keep CC_{31} informed of annual turnover, the activities of competitors, etc.

f) operate an active pricing policy.

The charter also contains regulations about the parliamentary organization, about membership and loss of membership and about the financing of joint retail activities. A breach of the charter by RC can result in loss of membership.

Chapter 5
Decision Integration

Allocation of the decision process among the components of a system features in many definitions of integration (for instance definitions *C, D, E, G* and *H* in ch. 3). In the literature on marketing systems the effects of centralized decision making on efficiency is a topic frequently discussed. In the social sciences in general, and in organization literature in particular, problems of defining, measuring, and analysing control in systems frequently occupy a prominent position. See for instance Bonini, Jaedicke & Wagner (1964), Price (1968, ch. 3) who reviews some studies on centralization and efficiency, Tannenbaum (1968), and works referred to in Ramström (1967, pp. 287 f.).

Thus the concept of decision integration which I have developed below for describing the degree of centralization of a decision process, is clearly related to existing integration concepts; it is also relevant to our discussion of efficiency.

This chapter is arranged as follows:

First I shall present the concept of decision integration.

Secondly the operationalization of the concept of decision integration is discussed. I shall seek a basis a) for ranking systems according to the degrees of decision integration they reveal for a particular activity and b) for classifying a system's decision integration for an activity.

In the third section of this chapter, and in the appendices, I shall report on some measurements made in the real systems.

Finally I shall analyse how institutional and decision integration are related to each other.

The Concept of Decision Integration

The main line of reasoning in this section is as follows. The decision process results in the choice of a single alternative from among all possible action alternatives. The final choice (the action decision) is made by the component which is going to execute the activity (the acting component). One of many factors affecting the final choice is information received from components on a higher level in the system, wishing to affect the decision. This *control information,* as we shall call it, can be interpreted as a wish to influence the chosen action alternative in *two* ways. First it indicates the attributes of one or more action alternatives which the *controlling component* wishes the *con-*

trolled component to consider. These attributes constitute the *controlling set.*[1] Secondly the control information indicates how closely the attributes of the action alternative chosen by the controlled component shall agree with the controlling set. The attributes of the chosen action alternative constitute the *chosen set.*

Decision integration is defined in set theory terms as the ratio between the number of elements in the intersection and union of the controlling and chosen sets. This will be discussed in detail later.

Before attempting to define decision integration we must clear up a few questions:

a) How can we describe the decision process as a reduction in the number of possible action alternatives, resulting in the choice of one?
b) What is control information?
c) How can we interpret control information as an expression of the intention to exert influence on the decision process of the controlled component?
d) What other types of influence on the decision process are there, besides control information?

I shall consider these questions below, after which we can return to the definition of the concept of decision integration.

The Decision Process as a Reduction in the Number of Action Alternatives

First we must define two sets. *The total set* (T) consists of the elements which, alone or combined in accordance with certain rules, can describe each of all the possible action alternatives. The subset of the total set describing the chosen alternative will be known as *the chosen set* (D). The total set is determined by an agent outside the subsequent decision process whom we shall call the *analyst.* Thus the alternatives of which the decision maker is himself aware do not affect the composition of the total set.

Elements in the Total and Chosen Sets

How, then, can the elements in the total set be expressed, and what are the rules according to which the chosen set can be specified as a subset of the total set?

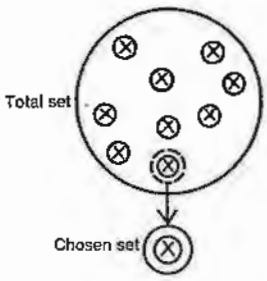
Three main cases are distinguished. They are illustrated in fig. 5: 1.

1) The elements in the total set describe *mutually exclusive action alternatives.* In this case the chosen set always consists of just one element. The total set often consists of a huge number of elements, since the number of mutually

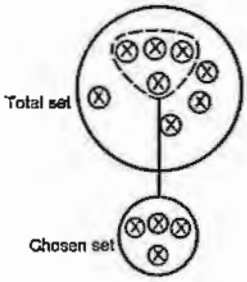
[1] The term control as used in this study is broader than the Swedish *kontrollera,* as was mentioned above in a footnote, p. 5. Cf. also the discussion of some control concepts in Tannenbaum (1968, p. 5) where the following is stated. "Its original application in business organization derives from the French usage meaning to check. It is now commonly used in a broader sense synonymously with the notions of influence and power."

Figure 5: 1 *The Elements of the Total Set and the Rules for Selecting the Chosen Set from the Total Set*

Case 1 The elements are mutually exclusive action alternatives



Case 2 Each element may or may not be included in the chosen set



Case 3 The elements in the total set can be identified as ordered pairs of elements of the basic and the attribute set

Basic set $\{b_1, b_2, b_3\}$

Attribute set $\{a_1, a_2, a_3\}$

Total set (Example) $\{b_1a_1, b_1a_2, b_2a_1, b_2a_2, b_2a_3, b_3a_1, b_3a_2, b_3a_3\}$

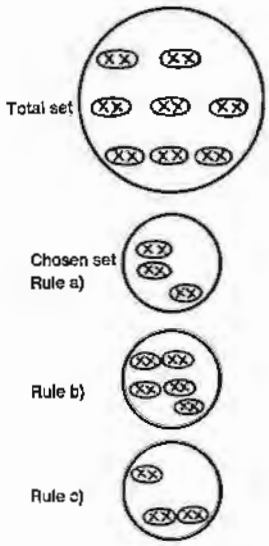
Chosen set (examples)

Rule a) $\{b_2a_1, b_2a_2, b_3a_3\}$

Rule b) $\{b_1a_1, b_1a_3, b_2a_1, b_2a_3, b_3a_3\}$

Rule c) $\{b_3a_1, b_3a_2, b_3a_3\}$

Illustration to case 3



exclusive alternatives is usually very large. Consider for instance the number of different retail assortments that can be combined from the total number of articles available on the market. This way of defining the elements of the total set is in most cases unsuitable for our purpose, as will become apparent later.

2) The elements in the total set describe an attribute that may or may not also be an attribute of the chosen action alternative. Thus *each (proper) subset of the total set describes an action alternative.* An illustration of this case is the choice of an assortment from the set of all articles available on the market.[2] The chosen assortment can consist of any combination of any number

[2] It was in considering the activity *choice of assortment* in various systems, that my ideas first began to emerge about the decision integration concept.

of articles. However, in a specific analysis, it may be necessary to impose some restrictions, for instance upper and lower limits for the number of elements allowed in the chosen set.

3) In this case the elements of the total set can be identified as *ordered pairs* of *two sets* which we will call the *basic set* and the *attribute set*.[3] Not all ordered pairs in the product set of the basic and attribute set are necessarily included in the total set, since some pairs may not represent possible action alternatives. An illustration: The basic set consists of the articles in an RC's assortment. The attribute set consists of numbers representing prices. Each article is represented in the total set by all the prices from the attribute set that, according to the analyst, are "possible". (See further on p. 77 for the meaning of "possible").

To choose a subset of the total set which will constitute an action alternative in a certain case, one of three rules applies:

a) Each element of the basic set is represented in the subset by one and only one of the ordered pairs. Example: Each article in a store's assortment has one and only one price at the same time. (This is of course not necessarily true in real systems.)

b) Each element of the basic set is represented in the subset by one or more of the ordered pairs. Example: Each group of merchandise included in the assortment is positioned in one or more areas of the store.

c) Not every element of the basic set has to be represented in the subset. For those that are represented, rule b applies. Example: An article included in the store's sales promotion assortment is displayed in one or more of the store's areas, or not at all.

In appendix 5: 1, definitions of the elements of the total set and the rules for selecting a chosen set are given for each activity.

The Stages of the Decision Process as They Affect the Choice

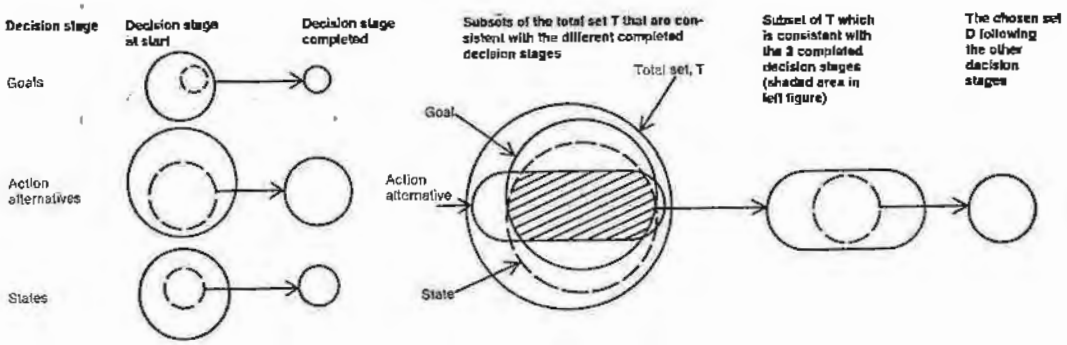
The decision process thus implies the choosing of a subset of the total set. The decision process has been described above as consisting of several stages such as initiation, search for and formulation of goals, alternatives etc. When the decision process runs through the various stages, this implies that the choice of the action alternative is affected. This can be described in the following way.

The analyst specifies all the "possible" starting-times for a decision process, all its "possible" goals, etc. Thus the initial state of every decision stage can be described as a set whose elements are starting-times, goals etc. As a result of the decision process a subset is chosen; the decision stage is thereby "completed".

[3] In set theory terms, the relation on the basic set and the attribute set can be described as a structure imposed on the basic set. E.g. the price or display structures of the assortment. See Odhnoff (1967).

This does not mean that the decision maker is aware at the start of all, or indeed any, of the elements describing the various decision stages. On the contrary all or some of the elements subsequently included in the set describing the completed decision stage can have been the object of search: the decision maker may have formulated state descriptions after making market investigations, or action alternatives after research and development work. On completion of a decision stage, some elements in the *total set, T,* may lose their relevance for possible future inclusion in the *chosen set, D.* Figure 5: 2 illustrates this. The goal formulation of the decision process consists of the choosing of a subset from the set of all "possible" goals. This means that although the other decision stages are not yet complete, some elements in the total set T have already become disqualified from inclusion in the chosen set, providing the decision process is logically consistent. The three decision stages together define the subset of T represented by the shaded surface in the figure. The chosen set, D, is a subset of this set, as specified by the other decision stages not separately mentioned in this example. This postulate—that the various stages in the decision process affect the final choice of action alternative—will appear later in support of my assumption that one component can affect another's choice of action alternative by influencing one or more of the decision stages, without specifying any action alternatives at all.

Figure 5: 2 *Each Decision Stage of the Decision Process Implies the Exclusion of Some Elements of the Total Set from Possible Inclusion in the Chosen Set*



The Decision Steps Affecting the Choice

Another way of looking at the decision process as a limitation of the number of action alternatives, is to consider the transformation activity of the various decision makers (p. 21).

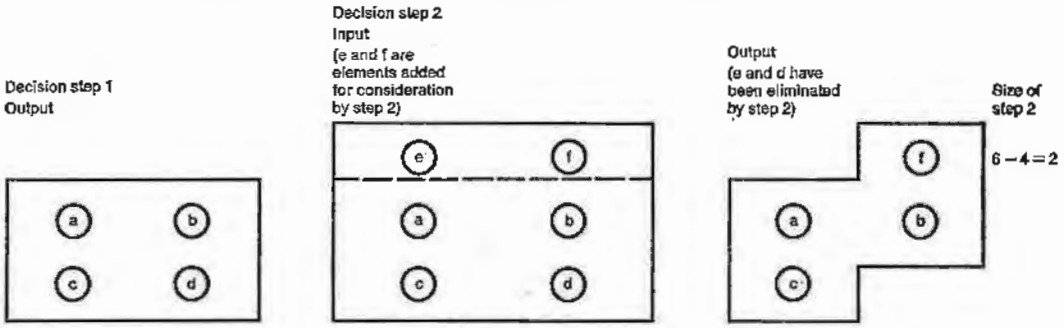
Each separate action decision is said to be preceded by *one* decision process which is carried out on the two levels of action decisions and general decisions. However, various parts of a decision process are always common to several

other decision processes (for the same or different activities) at the level of general decisions (p. 22). Each component taking part in a decision process is said to complete a *decision step*. General decisions and action decisions are the outputs of separate decision steps in a decision process. If a controlling component takes part in the action decision process of an activity carried out by the controlled component, it will only be able to suggest or prescribe an action decision, since by definition it cannot choose one (p. 22).

Having stated these premises we can discuss how each decision step affects the progress of the decision process towards the choice of an alternative.

The size of a decision step refers to the difference in the number of elements in two sets describing action alternatives: the input into and the output from the decision step. Input into the decision step is described as a set containing elements of the set describing the output from the preceding decision step *plus* elements describing other action alternatives considered by the component during the decision process. A consequence of the possibility of adding elements to the output of the preceding decision step is that the sum of the sizes of the decision steps can be greater than the number of elements in the total set, T. Fig. 5: 3 illustrates this.[4]

Figure 5: 3 *Illustration of the Definition of the Size of a Decision Step*



Control Information and the Controlling Set

A component can affect the final choice of action alternative in another component by supplying information that is included in the information processing of the receiving component.

Simon puts it thus:

[4] The formulation of this concept can be compared with Ramström (1967, pp. 154 ff.) who distinguishes between decision steps implying "limitation", "shift" or "generalization". In these terms decision step 2 in fig. 5: 3 is a "shift" (outputs of step 1 and 2 are compared). If element (f) had not been added it would have been a "limitation". If element (d) had not been deleted it would have been a "generalization".

"The behavior of a rational person can be controlled, therefore, if the value and factual premises upon which he bases his decisions are specified for him. This control can be complete or partial—all premises can be specified, or some can be left to his discretion." ... "Most often, influence places only partial limits upon the exercise of discretion." (Simon, 1957, p. 223.)

Maximum influence would require full specification of the action alternative to be chosen. On the other hand, little influence is involved, and much therefore left to the discretion of the recipient, when for instance the information refers to some vague, non-operational goal or to a large number of possible action alternatives.[5]

Different forms of control in organizations can be discussed in terms of the amount of influence they involve. Of those discussed by Rhenman (1964) and Ramström (1963), "direct control" probably leaves least to the discretion of the recipient, while "goal control" leaves most. "Program control" would come somewhere between the two.

Common to all cases, however, is the fact *that information is sent from a controlling component and received by a controlled one.* The information may be directly concerned with an action decision or with general decisions: in the latter case it will indirectly concern one or more action decisions.

The term *control information* will be used in this study to designate information which is *sent from a component on a higher level in the system to a component on a lower level, with the avowed purpose of influencing the decisions of the lower component.* Thus, in this study, only information from a higher to a lower level qualifies as control information. The definition does not specify whether the information does in fact affect the decision process.

Thus I classify messages here according to the intention of the sender, rather than the reaction of the recipient, though I do require that transmission actually takes place, i.e. that the recipient has received the message. Thus information that has no effect on the behavior of the recipient *can* be classified as control information, while other information, even though it does affect behavior, cannot be so classified because the influence was not intended by the sender. This definition has been chosen because, in operationalizing the concepts, great methodological difficulties would be involved in trying to associate information with the behavior of the receiving component.[6]

[5] "The amounts and kinds of discretion available to the organizational participant are a function of his performance program and in particular the extent to which the program specifies activities (means) and the extent to which it specifies product or outcome (ends). The further the program goes in the latter direction, the more discretion it allows for the person implementing the program to supply the means-end connections." (March & Simon, 1958, p. 147.)

[6] Rhenman (1964) and Strömberg & Wirdenius (1961) employ different grounds for classifying messages as control information (their term is "control impulse"). Rhenman sees the effect of the message on the recipient as the determining factor; Strömberg & Wirdenius are concerned with the sender's intentions and my definition resembles theirs.

Control information operates in two ways. First it indicates, directly or indirectly, the attributes of the action alternative that the controlling component wants the controlled component to choose, wholly or in part. This intended influence can be expressed as *a subset of the total set, T,* which I call *the controlling set, C.* Secondly, control information indicates a certain relationship between the chosen set and the controlling set, e.g. should the sets be equal, or how much are they to overlap?

The elements of the controlling set can be deduced from the contents of the control information. This may simply consist of a list of preferred action alternatives or attributes of action alternatives. Alternatively it may be concerned with certain alternatives or attributes which are *not* to be recommended. Or the control information may be aimed only indirectly at the action alternatives, trying instead to influence one or more of the decision stages in the decision process of the controlled component. That completion of these decision stages implies a reduction in the number of "possible" action alternatives has already been discussed above. Thus, influence on a decision stage can be seen as an indirect specification of attributes of action alternatives; that is, the control information still defines a controlling set. How the control information defines the controlling set is decided by the analyst.

It is assumed that control information sent to the controlled component on earlier occasions remains stored there unless some later information has canceled or changed it. If messages appear contradictory, it is assumed that those of a later date apply. In other cases of inconsistency between different messages in the control information, the controlling set also contains elements that are inconsistent with each other. Thus, in such cases, the controlling set is a larger subset of the total set and less restrictive on the discretionary behavior of the controlled component.

Since an element of the total set either does or does not belong to the controlling set, the preferences of the controlling component can only be divided into two classes: elements in the controlling set are preferred to those that lie outside.[7]

The second way in which control information operates is that it defines the desired relationship between chosen and controlling sets. The nature of this relationship will be clarified in the next section. The analyst interprets the control information also in this respect.

[7] In another respect, too, the elements in the controlling set are alike. They are not valued according to their "importance" in the activity concerned. For example, an article with a high sales volume and one with a low volume both represent one element in describing the activity *choice of assortment.*

Control Information Implies an Intention to Exert Influence[8]

The following represent the main types of influence intended by the controlling component:

1) The chosen set (D') shall *be identical* with (i.e. equal to) the controlling set, C, that is

$$\frac{n(D' \cap C)}{n(D' \cup C)} = 1.$$

The designation D' instead of D indicates that this is not the "real" chosen set; it is the chosen set that will, according to the expectations of the controlling component, describe the action decision.

2a) The chosen set shall be a subset of the controlling set; that is, it shall include *some but not all* the elements in the controlling set, and no other elements.

$$\frac{n(D' \cap C)}{n(D')} = 1 \text{ but } \frac{n(D' \cap C)}{n(D' \cup C)} < 1.$$

2b) The controlling set shall be a subset of the chosen set. Thus the chosen set shall include *all* the elements in the controlling set *and* other elements not specified by the control information.

$$\frac{n(D' \cap C)}{n(C)} = 1 \text{ but } \frac{n(D' \cap C)}{n(D' \cup C)} < 1.$$

3a) The chosen set shall consist to a certain extent (but not entirely) of elements of the controlling set. As a formula:

$$\frac{n(D' \cap C)}{n(D')} > a,\ a < 1.$$

3b) The chosen set shall consist to a certain extent (but not entirely) of the elements of the controlling set. How large a part of the chosen set shall come from outside the controlling set is in itself not specified by the control information. As a formula:

$$\frac{n(D' \cap C)}{n(C)} > b,\ b < 1.$$

These relationships are illustrated in figure 5: 4 and exemplified below.

1) Retail, i.e. controlled, component RC should follow the price list supplied by the central, i.e. controlling, component CC for all products.

2a) RC should choose its entire assortment from CC's list of articles, but not all the articles on the list.

2b) RC should carry all the articles indicated by CC in the common sales

[8] The term *influence* has been used to designate the relations between the controlling and the chosen set, as discussed in this section, although in fact the preferences of the *controlled* component concerning the composition of the chosen set may have a considerable effect. In an extreme case the controlling component might adjust the controlling set to agree entirely with the given preferences of the controlled compouent.

Earlier in this text the word influence has been used in its everyday meaning. Outside the specific context of the relations between the chosen and controlling set as defined in this subsection, the word will continue to be used in this sense.

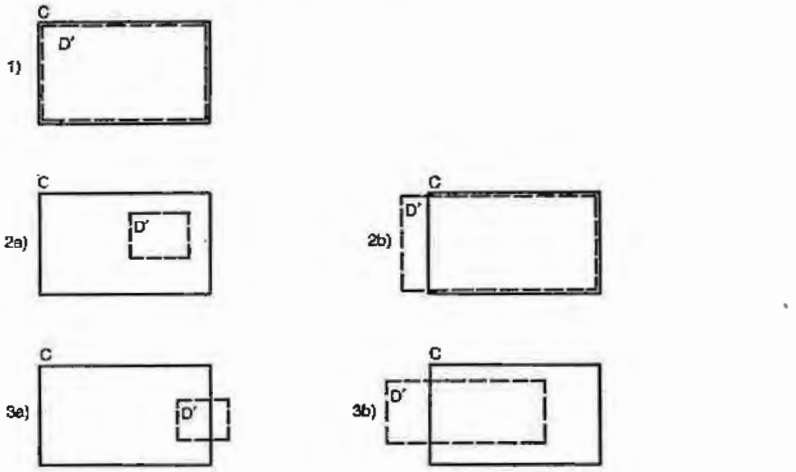
promotion program for the system, but articles from elsewhere are also allowed.

3a) RC should choose most of its assortment from the assortment carried by CC.

3b) RC should accept some of the display hints suggested by CC in sales promotion circulars.

Figure 5:4 *Intended Influence—Some Types of Relationship Between Chosen and Controlling Sets*

The numbers refer to the examples in the text.



Thus the term *intended influence* can indicate either one of the following ratios or a combination of them

$$\frac{n(D' \cap C)}{n(D' \cup C)}, \quad \frac{n(D' \cap C)}{n(D')} \text{ and } \frac{n(D' \cap C)}{n(C)}$$

depending on the content of the control information.[9]

When the control information explicitly indicates the elements of the controlling set, and it is intended that the controlling and the chosen sets shall be equal, I will speak of *the intention to exert influence resulting in identity between the chosen and the controlling sets,* or more briefly, the *identity intention.* Case 1 in figure 5:4 represents this intention. When the control information indicates the elements of the controlling set, but there is no desire for the chosen and controlling sets to he equal, I will call this *an intention to exert influence resulting in overlapping between the two sets* or, more briefly, the

[9] With regard to measuring a component's influence on the decision process, a comparison can be made with Ramström's concept "power of the decision". Without going into detailed comments we can say that, in the type of situation described in case 2a above, the "power" of RC's decision corresponds to the difference between the controlling and the chosen sets. (Ramström, 1967, p. 157.)

overlapping intention. This overlapping can be *complete* as in cases 2a and 2b or *partial* as in cases 3a and 3b.

When the control information aims at influencing decision stage(s) without any explicit indication of elements in the action alternatives, we can speak of the *intention to exert influence indirectly,* or the *indirect intention.* Indirect intention can be described as in cases 2a or 2b in figure 5: 4, with the elements of the sets implicitly defined by the control information.

Control information for any one activity may contain more than one type of intended influence. This will be discussed later on p. 80.

Types of Influence Not Included in the Control Information[10]

The influence intended by the sending of control information may or may not be fully realized. The controlled component's decision process is subject to influence from factors other than the control information and there may also be obstacles to a full realization of the intentions embodied in the control information.

Other influence stems both from other components inside and outside the system, and from information processing activities in the controlled component itself. March & Simon (1958, pp. 52 f.) present an "influence model" according to which individual behavior can be influenced via the "evoked set of alternatives", "the perceived consequences of evoked alternatives" and "individual goals". Each of the three types of influence in the model can be combined with each of the three types of influence sources mentioned. Examples: An *external* supplier mentions different display *alternatives* to the retail component in order to affect the display of his products. Another retail *component in the system* recommends the controlled component to put long-run system *goals* before short-run component goals. The *controlled component* makes his own assessment of the *consequences* of a proposed price cut as regards the behavior of competitors.

As can be seen from the examples, these other types of influence do not necessarily counteract the influence intended by the control information. On the contrary, they may support it.

According to our definition of control information, the relevant message must actually be received by the controlled component. Nevertheless, obstacles may still arise to frustrate the sender's intentions. Information may be misunderstood or forgotten by the recipient; or lack of resources may prevent the controlled component from carrying out the intentions of the controller.[11]

[10] Note that the term influence is here used in its common meaning and not according to the strict definition in the previous section.

[11] Rhenman has suggested three possible obstacles to control by the transmission of information: unsuccessful exchange of information, lack of resources or ability, lack of authority (Rhenman, 1964, pp. 14 ff.). The first two of these agree with those mentioned above.

Decision Integration

Certain factors relating to influences other than control information will be used in our operationalization of the decision integration concept at a later stage in the argument. However, as a concept (i.e. on the model level), decision integration is only concerned with control information and the chosen action alternative. Influences other than control information, as discussed above, may or may not hinder and/or help to realize the intentions of the controlling components. Note that decision integration, by definition, can never be greater than that intended by the controlling component.

Definition of the Decision Integration Concept

Decision integration (DI) is the ratio between the number of elements in the intersection and union of the controlling and chosen sets.

As a formula: $DI = \frac{n(D \cap C)}{n(D \cup C)}$

This formula refers to situations in which a controlling component influences *one action decision* of *one controlled component* regarding a *single one-dimensional activity*. This *primary situation* for which decision integration has been defined above, can be extended to include:

a) more than one controlled component
b) a multi-dimensional activity
c) more than one activity
d) more than one action decision per activity.

I shall now discuss decision integration, first in the primary situation, and then in the various wider situations described in (a)—(d). Finally I shall consider situations where all the points in (a)—(d) apply at once.

The Primary Situation

In analogy with intended influences, realized influence can be expressed as

$\frac{n(D \cap C)}{n(D)}$ or $\frac{n(D \cap C)}{n(C)}$

and, in case of identity intention as

$\frac{n(D \cap C)}{n(D \cup C)}$

Decision integration is expressed by the last of these ratios, whatever type of influence is intended. The first two ratios are not suitable for the following reasons:

a) A change in the size of the controlling set will, other things being equal, be followed by a change in the number of alternatives that the controlled component can choose while still "obeying" the controlling component, i.e. a change in the *discretion* available to the controlled component. I want the concept of decision integration to react to such changes. If, for example, the controlling set is almost as big as the total set, and influence is aimed at having the chosen set as a subset of the controlling set, then the

controlled component has very great freedom of choice. "Decision centralization" is very slight, but the ratio indicating the realized influence might quite likely be 1.

b) It is difficult to make a meaningful comparison between two situations, A and B, when the influence is expressed in A as an overlapping of the chosen set and in B as an overlapping of the controlling set (i.e. comparison between

$$\frac{n(D_A \cap C_A)}{n(D_A)} \text{ and } \frac{n(D_B \cap C_B)}{n(C_B)}$$

One reason for this is that in the first case a larger controlling set involves *less* restriction on the discretion available to the controlled component, while in the second case it involves *more*.

c) Other things being equal, differences in size between chosen sets do not always affect the ratio expressing realized influence, although the discretion available to the controlled component may vary.

d) Realized influence is unaffected by possible variations in the number of elements in the total sets in compared situations. But, other things being equal, this means that the discretion available to the controlled component will vary, when the influence ratio is less than 1.

These problems can be solved to some extent by formulating decision integration as the ratio between the intersection and union of the controlling and the chosen sets. We can now reconsider the difficulties mentioned above, using the examples of figure 5: 5 as illustrations. The size of the areas is proportional to the number of elements.

Cases 1 and 2 represent extreme values i.e. decision integration 0 and 1.

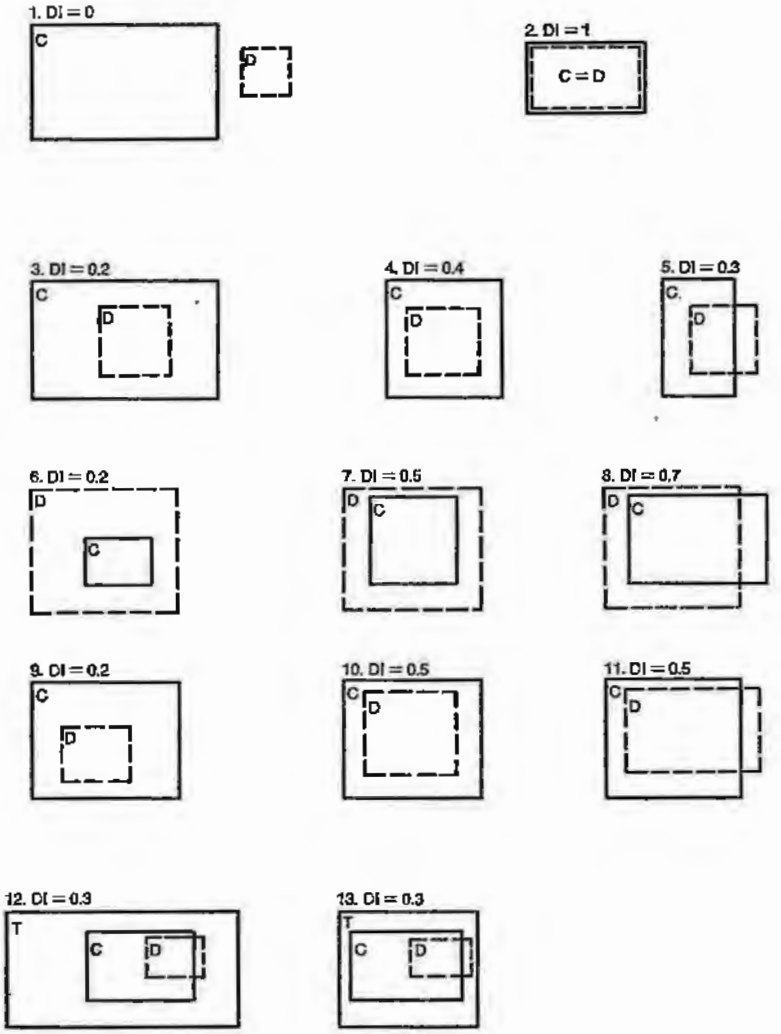
a) If influence is aimed at an overlapping of the chosen set, the influence ratio will make no difference between cases 3 and 4, but will place case 3 above case 5. Our concept of DI allows for the controlling set being larger in case 3 than in 4. The controlling set is so much smaller in 5 than in 3 that higher decision integration results, although in 5 part of the chosen set lies outside the controlling set. In cases 6—8 influence is aimed at an overlapping of the controlling set. The influence ratio puts case 6 above case 8, which is not a meaningful ranking order: the DI measures in the two cases are very different.

b) Is it meaningful to compare two situations, where the influence in one situation concerns an overlapping of the chosen set and in the other an overlapping of the controlling set? For example, the influence ratio ranks case 3 above case 8, which does not seem reasonable since the discretion is higher in case 3. The DI measure is relatively low in case 3 and relatively high in case 8.

The DI measure will naturally be much affected by the definition of the elements. We must therefore be very cautious when trying to draw conclusions from comparisons between situations in which the elements are dif-

ferently defined. If the comparison is concerned with the same dimension of the same activity, then the elements can be defined in the same way and a ranking becomes more meaningful. The number expressing the DI measure can of course vary for exactly the same situation, depending on the

Figure 5: 5 *Some Relationships Between Controlling Set (C) and Chosen Set (D), as Used in the Discussion of Decision Integration, DI*



definition of the elements; we should therefore be cautious when it comes to interpreting its meaning.

c) Cases 9—11 illustrate that the chosen set can vary between situations, e.g. the number of articles in the assortment. The influence ratio does not take

this into sufficient account. The larger the chosen set, the greater the restriction imposed by a given controlling set on the controlled component's choice of action alternative. In case 9 decision integration is therefore less than in case 11, although in case 11 part of the chosen set lies outside the controlling set.

d) Cases 12—13 illustrate the problem of comparing situations with total sets of different sizes. In cases 12 and 13 DI is the same, although case 13 implies that the controlling set imposes less restriction on the number of action alternatives. In case 12 two-thirds of the elements in the total set are outside C, as compared with only half in case 13. Since the DI measure takes no account of variations in the size of the total sets, one aspect of the commonsense meaning of "centralization" is being neglected here.

Up to now I have been assuming that the controlled component carries out the activity. However, if a retail activity is carried out by a central component in one system and by a retail component in another, there is still some interest in comparing decision integration for this activity between the two systems. I therefore state that when a central component carries out retail activities we have a special case of decision integration in which the chosen and the controlling sets are identical; that is, decision integration is equal to one.

More Than One Controlled Component

Our primary definition of decision integration allowed for one controlling and one controlled component only. If the concept is to be used to characterize whole systems, we must first characterize DI for every individual component pair (CC/RC). In such cases the controlling components must either be the same central component in all cases or hierarchically ordered separate central components. Otherwise an aggregation is not meaningful.

The degree of decision integration in a system can then either be described as a multiple whose elements are the DI-values of the respective component pairs or as an average measure, perhaps together with a further measure of the dispersion in the distribution of the DI values. Which of these methods is chosen will depend partly on how great the dispersion is, and partly on the purpose of the description.

A high degree of decision integration in a system does not by definition imply uniform behavior throughout the system. A low degree of integration can also be consistent with a high degree of uniformity. This is illustrated in figure 5: 6 (next page).

A Multi-Dimensional Activity

In describing decision integration for an activity with several dimensions, a major obstacle is the arbitrary nature of the definition of elements.

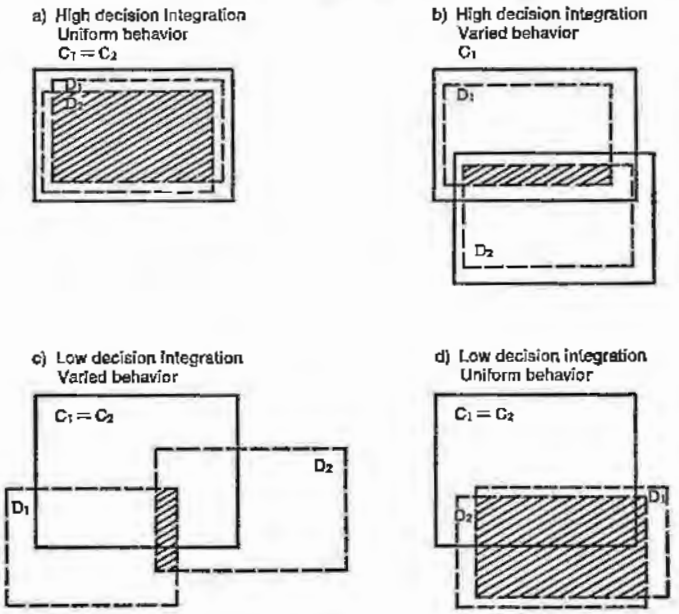
We cannot describe different dimensions with the same element definitions. Assume that we are to compare two situations embracing the same two-dimen-

sional activity (e.g. *ordering* in the *quantity* and *time* dimensions). Assume that in one case the DI-values for the two dimensions are about 0.5 and about 0.9 and in the second case 0.2 and 0.6. The average values, 0.7 and 0.4 respectively, do not tell us very much. On the other hand, it is possible to rank the decision integration of the two activities on a basis of the individual figures for each dimension. We might also be able to classify the degree of decision integration for the dimensions, e.g. into "medium high" and "high" in the first case, and "low" and "medium high" in the second. The interpretation of such classifications must however always consider the arbitrariness of element definitions and the choice of rules for selecting subsets describing possible action alternatives.

Decision integration of a multi-dimensional activity, is described by a multiple whose elements are the DI-values of the various dimensions. In a comparison between situations, these multiples can then be ranked, either by applying the rules of strong or weak ordering, or by calculating the mean of the elements in each multiple. Which method is chosen will depend on the requirements for the specific purpose of a particular analysis.

Figure 5: 6 *Some Combinations of Degree of Decision Integration and Degree of Uniformity in Behavior*

The system consists of one central component and two retail components. (RC_1 and RC_2). The shaded area shows the intersection set between the chosen set D_1 (for RC_1) and the chosen set D_2 (for RC_2). C_1 is the controlling set, which aims at influencing RC_1. C_2 is another controlling set, for influencing RC_2.



More Than One Activity

Describing and comparing situations embracing several activities involves the same sort of problems as those we have just discussed. The decision integration as a combined measure for several (one-dimensional) activities can be described as a multiple. Situations embracing several activities can thus first be compared activity by activity; ranking then follows the rules mentioned above. For reasons similar to those quoted in the above subsection, the average DI value for several activities does not tell us very much.

More Than One Action Decision per Activity[12]

Up to now we have been discussing the DI values of single action decisions. The description might however be concerned with one or more time periods during which there are several action decisions for an activity. In this case the element definitions and rules for combining them into action alternatives are the same, and the component pair is the same in the situations to be aggregated. This means that the objections we have just been discussing to the use of average values do not apply. If there have been big changes in DI, an average figure will be misleading, but if the changes are small, or the relative number of sharply deviating (with regard to DI) action decisions is low, an average value can be used for most purposes.

Allowing for Several Component Pairs, Several Dimensions, Several Activities and Several Action Decisions

We have discussed the primary situation extended in four respects, and can now undertake a total description of the decision integration in a system. The primary situation can be identified by a quadruple of elements from the following four sets:[13]

The set of *component pairs* (i.e. controlling and controlled component) $K = \{k_1, \ldots k_e, \ldots k_k\}$

The set of *dimensions* in the activities $L = \{l_1, \ldots l_f, \ldots l_l\}$

The set of *activities* $M = \{m_1, \ldots m_g, \ldots m_m\}$

The set of *time points* when the actual decisions occur $N = \{n_1, \ldots n_h, \ldots n_n\}$

Not all the quadruples correspond to a primary situation since, for example, all dimensions are not included in all activities; nor has it been assumed that action decisions are made at all time points for all activities.

Every primary situation has a DI value. Thus for each quadruple there exists a corresponding DI value. In discussing the case of "more than one activity" we were thus concerned with the DI values corresponding to the quadruples $(k_e, l_f, m_1, n_h), \ldots (k_e, l_f, m_i, n_h), \ldots (k_e, l_f, m_m, n_h)$. When describing decision integration for the whole system with all its activities, components

[12] The delineation between different action decisions was discussed on pp. 20, 22 above.

[13] E.g. the quadruple $\{k_e, l_f, m_g, n_h\}$ might be interpreted as the primary situation component pair "RC_a/CC" in the *technique* of the *ordering* activity at time point t_{12}.

etc., an extreme case would be to obtain a DI value expressed as a number between 0 and 1 for the system as a whole. Such a figure, however, would tell us very little. Or, to take the other extreme position, we could describe the system's total decision integration by giving the DI value for each of the primary situations, i.e. for each of the relevant points in the KxLxMxN-space. Such a description would be difficult to comprehend. To a great extent, of course, the method of aggregation chosen will depend on the purpose of the description and on the differences in DI between component pairs (in the K-set) and between action decisions (in the N-set). Thus no general rule can be given. For most purposes, however, the extreme methods do not seem suitable.

Operationalization of the Decision Integration Concept

According to our definition, the decision integration variable may exhibit any value between 0 and 1. Since measurement of decision integration poses so many problems, I have limited the operationalization of the concept below to a ranking of the decision integration of various aggregates of primary situations, and to a classification of the degree of decision integration.

Empirical studies of decision processes in organizations or in groups reveal a variety of research methods. For example: interviews (using unstructured interviews or wellstructured questionnaires), experiments, and direct observations. See Ramström (1967, pp. 286 ff.), for a survey of the empirical research in this area. In common with many writers referred to by Ramström, I have chosen unstructured interviews as the main vehicle for obtaining information. Some data has also been gathered in questionnaires and by the direct observation of written information.

I will first comment briefly on an alternative research approach: direct observation of the control information and the chosen set.

The chosen set is a description of both the action decision and of the execution process (p. 22). The chosen set could therefore be observed by observing the way activities are carried out. It should be possible, methodologically speaking, to observe the chosen set in most given situations. The chosen set for the activity *choice of assortment* in the dimension *identity of article*, for example, could be observed through stock-taking and examination of the order forms. On the other hand vast research resources would be required to carry out such observations for several activities, components etc.

To describe the *controlling set* we could observe all the control information that is relevant to the activity and the component concerned; starting from this we could then interpret this information to find out which elements are included in the controlling set and what relation between the chosen set and the controlling set is intended. Since control information can also be stored in

the memory of the recipient, the survey of control information would have to cover earlier periods as well. Such a detailed description, first of the control information and then of its transformation into a description of the controlling set, would involve considerable methodological problems. Moreover the actual observations would make great demands on resources.

Since my present interest is to compare several activities as between systems, and since the resources available are small, I cannot here use a method involving the direct observation of control information and action alternatives.

Methods Used for Ranking the Decision Integration of an Activity Between Systems

General Survey

The following is a brief survey of my methods. Figure 5: 7 provides an outline of the various stages in the measurements.

From interviews with the controlling and controlled components a basis is obtained for describing influence in terms of intention (i.e. *identity, overlapping* or *indirect* as defined on pp. 66 f.). Decision integration is defined as a ratio whose denominator is the union of the controlling and the chosen sets, while intended influence is expressed as a ratio whose denominator (except where the aim is identity) is either the chosen *or* the controlling set. Thus the description of intended influence has to be supplemented by a description of the relative approximate numbers of elements in the controlling or the chosen sets in the compared situations. As we shall see later, it then becomes possible to rank situations according to the degree of *intended decision integration*. The definition of intended decision integration differs from that of (realized) decision integration in that the chosen set describes not the "real" action decision (D) but the action decision included in the description of the intended influence (D').

For various reasons, the decision integration actually achieved may not agree with the intentions embodied in the control information (pp. 67 f.). I have therefore introduced a number of factors that can affect decision integration (*DI-affecting factors*). These are:

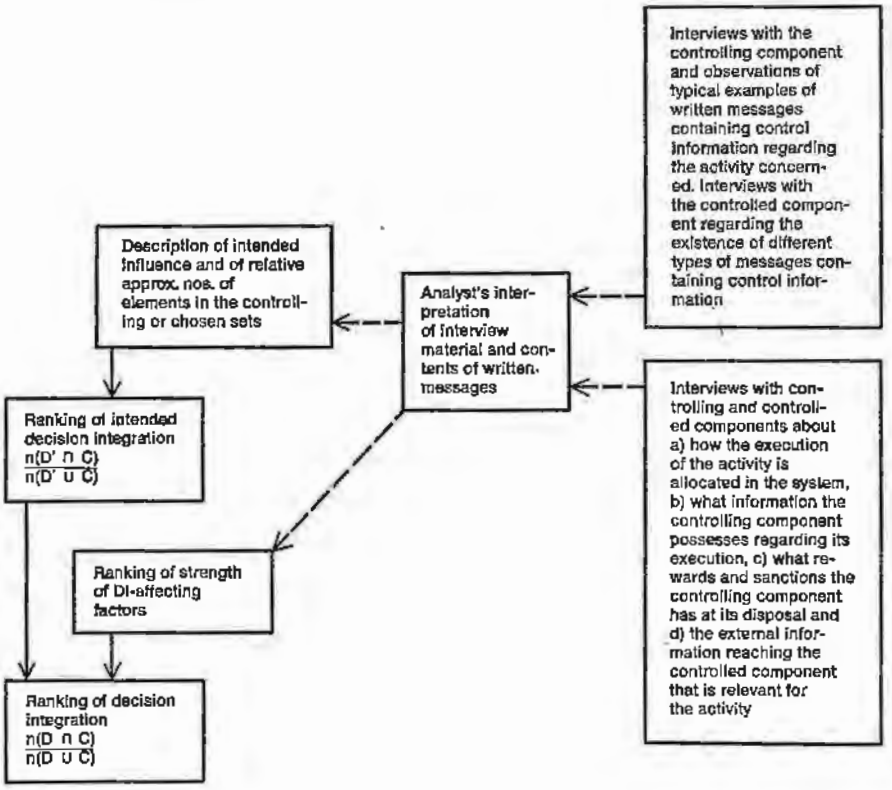
a) *execution* of activities in the controlling component,
b) *system of rewards* by means of which the controlling component can reward or punish the controlled,
c) *review information* in the controlling component, indicating the way in which the activity has been carried out and
d) *external information* to the controlled component from components outside the system.

I have assumed that each of these factors, when compared between situations, can be ranked according to their efficacy in affecting the decision proc-

ess towards realization of the intended influence. The ranking of intended decision integration is then corrected accordingly, using certain rules that will be specified.

This general survey will now be expanded in the three following subsections: Indicating the Elements and Combining Them into Action Alternatives, Ranking of Intended Decision Integration, Ranking of Decision Integration.

Figure 5: 7 *Stages in the Measurements Leading to the Ranking of Decision Integration Between Systems*



Indicating the Elements and Combining Them into Action Alternatives

Only in a few cases in the empirical study do I explicitly list or count the elements in the total, controlling or chosen sets. However, it is always necessary to indicate how the elements have been defined, and which combination rules have been used. Without this knowledge, it is not possible to evaluate the validity of the methods, used in the operationalization of the DI concept. The definitions and rules used for the various activities in the account of the empirical study are presented in appendix 5: 1. I discuss below two typical examples from the appendix.

a) Retail Activity *Choice of Assortment*, Dimension *Identity of Article*
The element of the *total set* is an article in the total assortment available to the retailer in the types of merchandise decided in his *choice of assortment* activity, dimension *identity of type of merchandise*. My definitions of *article* and *type of merchandise* agree in the main with those used in the empirical study in Kihlstedt (1961). (Kihlstedt uses the term variety.) But what is meant by the total available assortment? Does it mean all the assortments held by all the suppliers in the world, or in Sweden, or in the local region? Or does it simply mean the suppliers from whom the retailer has decided to buy goods (in his *choice of suppliers* activity)? The last of these would be too narrow a class. It would exclude, for instance, articles in the assortments of potential suppliers who visit the retailer. On the other hand, to include all the suppliers in the world would be to go too far. I have decided to let the analyst's definition of the "normal" supplier contacts for retailers in a certain trade and a certain geographical area be the deciding factor. "Normal" does not refer here to an average; it even allows for considerable deviations from "average" behavior. The total set T is therefore defined, with regard to groceries, by the assortment lists of general food wholesalers on the regional market, Swedish manufacturers selling directly to retailers, and specialist wholesalers on the regional and national markets. From all of these categories I, as the analyst, consider it to be "normal" for the retailers to buy groceries. Direct import by the retailers would in this case be an example of "abnormal" behavior.

The *chosen set* can consist of any subset of elements from the total set, provided that at least one element representing each type of merchandise is included and that the number of elements in the subset is less than three times the average number of articles in stores of the same size.

b) Retail Activity *Pricing*, Dimension *Price per Article*
The elements in the *total set* are composed of ordered pairs of elements of the basic set, *articles*, and the attribute set, *prices*. The elements of the basic set are the articles included in the chosen set for the *identity of article* dimension of the *choice of assortment* activity. The elements of the attribute set are numbers, representing possible prices for at least one article in the assortment.

What are the possible prices of an article? A lower and an upper limit will have to be set. These limits are decided by the analyst. He decides which prices are very unreasonable or extremely unlikely from the point of view of profitability or in light of the retailers' previous behavior. Since the lower and upper limits will not be the same for all articles, not all the ordered pairs of elements of the basic and attribute sets will be included in the total set.

For each element in the basic set one, and only one, of the corresponding elements in the total set is selected for inclusion in the *chosen set*. Thus

each article has one price, but only one, at any given moment. (Quantity discount on purchases of more than one item of a particular article will be described in the dimension *price differentiation system*. I have not included this dimension in my empirical study.)

Ranking of Intended Decision Integration

In my report on the empirical study I only discuss decision integration in retail activities, although decision integration in wholesale activities could be measured in the same way.[14] For the sake of simplicity the retail component, RC, will be used in the following pages as a synonym for the controlled component and the central component, CC, as a synonym for the controlling component.

In measuring decision integration, central components on different levels are combined to form a single component. In other words, for the time being, I am using a larger central component than in chapter 4. This means that control information to RC from all the central components on the different levels included in our system description (p. 49), will provide a basis for the ranking of decision integration. However, in the report of conditions in the real systems on pp. 87 ff., I sometimes indicate CC on a certain level as sender of information, as carrying a certain assortment etc. But these indications, as such, do not influence the result of the measurements in any way. I have taken my basis for describing the central component's intended influence from interview material provided chiefly by officials of the central component.[15] The description of intended influence is concerned with action decisions, at the particular time of investigation, typical for all RCs or, if the differences between RCs were great, then typical for groups of RCs.

Intended influence can be aimed at identity, overlapping or indirect effects. The following discussion of the ranking of intended decision integration as between two situations, A and B, will cover the following cases: (a) the same type of influence is intended in A as in B, (b) different types of influence are intended in A and in B, (c) different combinations of intention type in A and B, (d) both A and B imply combinations of intended influence types and the various intentions do not apply to the whole extent of the activity, (e) as (d) but the various types of intended influence apply to certain RCs only in A and in B.

a) If the *same type of influence* is intended in both situations and the intention is to achieve *identity* between controlling and chosen sets, then the intended decision integration will in both cases be equal to 1. If the aim is *overlapping*, attention must he paid to the differences in intended influence ratios *and* differences in the number of elements in the controlling (or chosen) sets as between A and B. The different *degrees of overlapping*

[14] The control information would then be sent from a central component on a higher level in the hierarchy to a central component on a lower level.

[15] See interview guide in appendix 4: 2, points 4, 5, 8, 10.

are complete, very high or *high overlapping.* These degrees are assumed to correspond roughly to the intended influence ratios: 1, about 9/10 at the lowest, and about 2/3 at the lowest. If the overlapping is to take the form of an overlapping of the chosen set

$$\left(\text{i. e. as } \frac{n(D' \cap C)}{n(D')}\right),$$

the intended decision integration in A will always be ranked above that in B, providing both the degree of overlapping is higher *and* the controlling set is smaller. If the intention is an overlapping of the controlling set

$$\left(\text{i. e. as } \frac{n(D' \cap C)}{n(C)}\right)$$

A is ranked above B if the degree of overlapping is higher *and* the chosen set is smaller. Given equal degrees of overlapping *or* equally large controlling (or chosen) sets a ranking is always possible. If, on the other hand, the degree of overlapping and the number of elements in the relevant set point in different directions, a special estimate will have to be made, and reported, before any ranking of intended decision integration becomes feasible.

If the influence intended is of the *indirect* type, the control information will contain no explicit indication of the elements of the controlling set. We therefore have to use indirect criteria in our ranking of intended decision integration. We could assume, for example, that intended decision integration is greater when control information concerns more stages of the decision process, or indicates a higher operationality of goals, or is transmitted more frequently, or contains information relevant to a greater part of the activity concerned. I have chosen two of these indirect criteria: (a) the number of CC/RC contacts per period at which control information is transmitted—the greater the number, the greater the *penetration* of the intention to exert indirect influence, and the higher the intended decision integration. (b) towards how great a part of the activity (measured in output terms) is the indirect influence directed—the greater this proportion, the greater is the *width* of the intention to exert influence and the higher the intended decision integration. In the present subsection I am concerned only with cases where the intended influence is directed towards the whole activity. Thus, the sole criterion for ranking here is the penetration measured as the number of contacts between CC and RC per time period.

I have chosen this particular criterion for a variety of reasons. The more often CC is in contact with RC, the greater presumably is CC's interest in exerting influence and readiness to invest resources in the transmission of control information. Frequent transmission of control information also means information that is likely to be up-to-date and relevant; it means, too, that during a given time period a larger number of the individual

decision processes are likely to be affected. Other possible criteria that I considered were the degree of operationality of the goals at which the indirect influence might be directed, and the number of decision stages that the control information is intended to influence. Problems of measurement made me abandon this idea.

b) When *different types of influence* are intended in A and in B, three cases can be distinguished. For two cases one of the aims is to achieve identity. The intended decision integration will always be higher at the identity intention than at the *indirect* or *overlapping* intentions. For the third type of comparison I assume that in cases where the influence intended is of the indirect kind, the degree of intended decision integration will be relatively low. The reason is that the completion of each separate decision stage will probably not impose very strong limitations on which elements may be included in the chosen set (p. 61). To put it more precisely, I assume somewhat arbitrarily that in cases of indirect influence the controlling set is always at least three times as big as the chosen set (that is, if the intended influence ratio has the chosen and not the controlling set as its denominator). This leaves 1/3 as the highest possible value for intended decision integration.

   If instead the aim is overlapping, it is possible to calculate, for a given degree of overlapping, the ratio between the controlling and chosen sets that will lead to a DI value of more than 1/3. Thus intended DI will be 1/3 when the controlling set is 3 times as large as the chosen set, if complete overlapping is intended. When an overlapping case cannot be ranked above an indirect case in accordance with the above, I have decreed that the cases should be ranked as equal. In the empirical study there are no such cases. (Cf. appendix 5: 3.)

c) If the control information expresses *more than one type of intention*, the following rules apply. If the intention is to achieve identity between the controlling and the chosen sets, no other type of intention can apply even if the control information as such contains descriptions of goals, states etc. intended DI is always equal to one. An intention to exert indirect influence on an activity and to achieve overlapping, can exist side by side. In combinations of this type, the indirect intention can either raise the intended DI as expressed by the overlapping intention, or it can leave it unchanged. The former case applies if the relevant control information is directed towards the choice of action alternative in a subset of that controlling set to which the intended overlapping refers.

d) Intended influence may be directed towards *part of an activity only*. In the *choice of assortment* activity, for example, identity may be required with regard to sales promotion articles, high overlapping for articles in four out of five groups of merchandise, while for a fifth group the only influence intended may be of the indirect type. In comparing the intended decision

integration of two situations, we shall have to take into account how great a part of the total extent of the activity the various intentions are aimed at. The total extent of an activity is defined according to an output measure, that can be assumed to vary roughly in proportion to the number of elements in the chosen set.

e) Intended influence may apply to *certain components in a system only.* For example in the activity *acquisition of capital,* dimension *right of disposal of profits* (*losses*), indirect influence may be the aim for all RCs except those in which CC has large financial commitments, where the intention may be high overlapping. In comparing the intended decision integration of two situations, we shall have to weight the various intentions with the number of the system's components to which they refer.

The way in which the analyst interprets the descriptions emerging from the interviews in terms of the concepts developed here, represents a subjective aspect in the ranking of intended decision integration. In schedule 5: 1 I give some examples of such interpretations. The text in the left column consists of excerpts from the interview records. The column at right consists of extracts from appendix 5: 3, where the rankings of decision integration are motivated.

Schedule 5: 1 *Examples of Interview Material Interpreted in Terms of Intended Influence*

Activity and dimension	Description according to interview records	Description of intended influence (From schedule A 5:3)
Pricing (*Price per article*) FII system	RC receives messages containing CC's decision about exact prices. Prices for regional warehouse assortment appear on the delivery note. Price marking of some perishables has already been carried out by CC. CC issues price lists for all articles outside the central warehouse assortment. On a basis of purchase prices and margins which are set by CC, RC calculates the price of goods lacking a given resale price (certain perishables with unstable prices). In accordance with CC's general decision RC can decide on price reductions for damaged goods.	For nearly 100 % of the activity, influence aims at identity. Exceptions are perishables with unstable prices and damaged goods for which indirect intended influence applies.
Sales promotion (*Identity of article*) NII system	CC chooses promotion articles each week (Yellow List). An advertising committee in CC makes a selection from this list for about 20 RCs in town X forming an advertising group. Together with items from the assortment of the Meat Marketing Association these represent the promotion items for the weekly group activity carried on in X-area. It is hoped that even RCs outside the group of 20 will order the promotion items and sell them at the campaign price. CC often reminds RC of	For the weekly SP-program: identity for RCs in the "advertising group", high overlapping for other RCs. Common SP is less comprehensive

Schedule 5: 1 (cont.)

Activity and dimension	Description according to interview records	Description of intended influence (From schedule A 5:3)
	the campaign on visits to the cash-and-carry warehouse or in contacts with the order personnel. These weekly activities are on an average only a relatively small part of RC's total sales promotion operations. The greatest part is manufacturer-planned SP.	than in the PII systems. Indirect influence for individual SP.
Positioning/refilling (Positioning of merchandise types) PII-R system	RC decisions about work organization in the store and merchandise handling activities are generally made without much information or influence from CC. Exceptions are new stores to which CC is committed financially etc., and large or medium-sized stores with profitability problems. In decisions about organization and handling routines in new stores, CC's influence is probably much greater than RC's. Follow-up of organization and routines is the task of the sales consultants. A certain amount of influence also comes from the ICA journal, the ICA school, and members' meetings . . . Positioning of goods in new stores follows CC's system. The "Ideas Leaflet" gives advice for SP articles. Sales consultants give advice and check from time to time that SP articles are properly displayed. CC does not want to control the details of this activity since it is felt that the individual RC might lose initiative and become less active in other respects too . . . RC's influence on the planning process of a new store depends on how soon its leader/owner becomes engaged on the project. Normally RC is involved in the planning of equipment, composition of the assortment, and the allocation of space to different groups of merchandise. In stores planned only a few years ago, RC had greater influence on these matters. Extensive rebuilding of premises or modernization of stores is generally initiated by CC; CC is also much involved in the planning, financing and execution.	Very high overlapping with regard to new stores and some rebuilding and modernization cases. Indirect influence . . . for other stores. Indirect influence concerned mainly with display of SP items.

Ranking of Decision Integration

The ranking of intended decision integration cannot be made to apply, without adjustment, to realized decision integration.[16] It has to be remembered that differences between intended and realized influence in the systems can

[16] According to its definition decision integration without modifying adjective is always "realized".

change the ranking order. I have therefore defined four DI-affecting factors—the execution of activities, the system of rewards, the review information and the external information. With regard to the choice of system of rewards and external information as factors I refer to the "influence model" on p. 67. The choice of the other factors is motivated below. The values of these factors have been ranked between the systems. According to certain rules, which I shall present below, the rankings of intended DI and of the DI-affecting factors together provide a basis for ranking the decision integration.

Execution of Activities. For the part of an activity that CC itself performs, CC makes the choice of action alternative. Thus when CC performs the whole activity, decision integration is always 1.

The greater the extent of the activity (according to output) executed by CC, the higher the value of the DI-affecting factor *execution*. This is because the identity intention always applies and is always realized for the part executed by CC, and because CC thereby provides itself with a better opportunity for influencing conditions contingent on those parts of the activity carried out by RC. Ranking has been based on answers to the questions under point 6 in the interview quide, appendix 4: 2.

System of Rewards. CC can operate a system of sanctions and rewards, related to the presence or absence of deviations between intended and realized influence (provided CC possesses information about RC's behavior). This provides CC with a way of influencing the consequences to RC of obeying or disobeying CC's wishes as expressed in the control information. A rewards system can consist of both rewards and sanctions controlled by CC. Rewards and sanctions can be of two sorts: *economic* or *administrative*. Economic rewards or sanctions can affect the flow of payments to or from RC in such a way that the effect is felt on RC's profit and/or on the *personal* finances of RC's manager and/or personnel. Possible elements in a system of economic rewards are, for instance, price differentiation and wage conditions. An administrative system of rewards can also have economic consequences for RC but does not imply any direct influence on the payments flow. Rewards and sanctions in this class are usually but not always based on institutional relations between RC and CC. Possible elements in an administrative system of rewards are: promotion, demotion or dismissal of store managers or other employees, expulsion of RC from the system, praise and blame of RC's manager and personnel.

Assume that RC, in a situation A, deviates relatively far from the behavior indicated by the intended influence, and in a situation B, deviates not at all. The value of the rewards factor will be greater, the greater the difference in goal fulfilment for RC between A and B resulting directly from an application of the rewards system. Any detailed discussion of the problems of motivation that are encountered in ranking reward systems, lies outside the scope of this study. (In the literature on influence in groups and organizations, reward

systems occupy a prominent position. See e.g. Cartwright, 1965.) I will only present the general assumptions that underlie the rankings made here. (Rankings are reported in appendix 5: 3.)

Serious administrative sanctions in the shape of dismissal or demotion of manager or personnel or expulsion of the whole RC from the system, invest the rewards factor with its highest value. Administrative evaluations that directly affect promotion etc. of manager/personnel rank higher than those leading only to praise or blame. Praise and blame rank higher in systems with full institutional integration than in other systems. Economic rewards that directly affect the personal economy of manager/personnel rank above rewards that do not. A rewards system, A, ranks above another system, B, if it possesses the same rewards and sanctions as B plus some more. The basis for the rankings is provided by answers to some of the questions under points 8 and 11 in the interview guide, appendix 4: 2. Appendix 5: 2 contains a general comparison between the studied systems.

Review Information. The quality of the review information, telling CC how activities are carried out, can vary very much. By *quality* I mean how well the content of the information mirrors the properties of the *real* situation. (I use the quality concept as it has been developed in Ramström, 1967, p. 125.) The more closely the information content agrees with reality (i.e. with the chosen set), the greater the value of the review information factor. Note that review information as a DI-affecting factor is used here in a narrower sense than in the decision model (pp. 22 f.). Here we are concerned only with a description of the chosen action alternative as such, whereas review information in the decision model also includes information about environment and goals.

This factor has been included because the incoming review information affects CC's chances of discovering deviations between intended and realized influence. This in turn affects the possibility of applying the rewards system and, by sending out further control information, perhaps of reducing future deviations during the studied period.

To rank this factor between the different systems, I made use of interview material (see interview guide points 5, 8 and 10) about RC's reports to CC, RC's order and payment routines, purpose and frequency of CC visits to RC, internal auditing etc. I have not developed any generally applicable method for the ranking. Instead I, as the analyst, evaluate in each case the way in which the quality of the information is affected by the frequency of contact, the information content, and the method of collection. The basis for my evaluations, together with the rankings, are reported in appendix 5: 3.

However, some criteria can be established: if CC carries out the activity, the review information factor achieves its maximum value; other things being equal, the value of the factor is higher, the greater the frequency of contacts between CC and RC at which control information is transmitted; a system, A,

ranks above another, B, if A contains the same information as B plus some more.

External Information. Among possible reasons for a deviation between intended and realized influence, I have mentioned information from external components. I assume that the greater the quantity from outside sources of information relevant to the decision process, the greater will be the deviation. In this category I have not included external information requested by CC to supplement its own control information. *Quantity* of information on the model level is defined according to Ramström (1967, pp. 118 ff.). This will be discussed in chapter 8. Here I need only point out that quantity of information refers to information in the semantic sense (p. 16).

Since it would be very difficult to measure the quantity of information directly in an empirical study as broad as mine, I have had to use an indirect criterion for the ranking. I have chosen as my criterion the *number of occasions per time period when contact is made* with external components in the various external sectors (i.e. suppliers, consumers etc.) The external information factor ranks higher, the fewer the external sectors from which relevant information is received during the period studied and the fewer the contacts with components in these sectors, at which relevant information is transmitted. Note that, to make its definition analogous with the other factors, the DI-affecting factor external information has a higher value, the lower its quantity.

Interviews with RC and CC provided the basis for the rankings (see points 5 and 10 in the interview guide).

The four DI-affecting factors are ranked for each activity dimension, as between the compared systems. These rankings can then be combined with the ranking of intended decision integration, to provide a basis for a subsequent

Schedule 5: 2 *Rules for Ranking the Decision Integration of Systems A and B, Given Different Combinations of the Rankings of Intended Decision Integration and DI-Affecting Factors*

Ranking of intended decision integration	Ranking of DI-affecting factors	Ranking of decision integration
A above B	For at least 3 of the factors B is ranked above A	B above A
	For 2 of the factors B is ranked above A and A is ranked above B for at most 1 factor	A the same as B
	All other cases of ranking	A above B
A the same as B	A is ranked above B for at least 2 of the factors and B above A for at most 1 factor	A above B
	Analogous with above	B above A
	All other cases	A the same as B

ranking of decision integration for each activity dimension. Rules appear in schedule 5: 2.

The decision integration of multidimensional activities are then ordered by taking the average rank for the decision integration of each dimension.

Classification of Decision Integration

According to our definition, decision integration (DI) can assume values between 0 and 1. As we have already seen, this figure in itself is hard to interpret, particularly when we compare the figures for different activities. However, I assume that a rough classification can be meaningful as a measure of the degree of decision integration exhibited by the various activities in a system, even if the somewhat arbitrary choice of definitions of elements in the total and chosen sets may influence the classification. It is possible, given certain element definitions, to express a particular activity's DI very roughly as a number between 0 and 1. Five classes are distinguished, namely: Full DI, Very High DI, Medium High DI, Low DI and No or Very Low DI. Arbitrary boundaries between the classes have been set at: nearly 1, 2/3, 1/5 and nearly 0. These boundaries have affected the various values in the class definitions below. The definitions are based on the type of intended influence, the size of the chosen set in relation to the controlling set, and the DI-affecting factors.

When the intended influence aims at overlapping, I assume below that this is formulated as an overlapping of the chosen set. Corresponding definitions will apply in cases of an overlapping of the controlling set.

The classification scheme below applies either to individual RC/CC relations or to the whole system. In the latter case the attributes of the classes refer to an arithmetic mean of the system's RC/CC relations.

The classification below refers to single dimensions of an activity. Multidimensional activities are classified as an average of the classification for the dimension's unweighted arithmetical mean with classes numbered 1 to 5.

Full DI. Influence is intended to result in identity. The activity is carried out entirely, or almost entirely, by CC. If RC carries out any part of the activity, then the three factors—rewards system, control information, and external information—must exhibit high values.

Very High DI. One, or both, of the following conditions shall apply for at least 90 % of the activity's output:

a) Intended influence aims at identity.
b) Intended influence aims at complete or very high overlapping. The number of elements in the controlling set is at most 1/4 greater than the number in the chosen set.

Also, at least two of the factors rewards system, control information, and external information, must exhibit high values; or the relevant part of the activity must be executed by CC.

Medium High DI. The situations included in this class do not fulfil the

requirements of Very High DI but more than fill the requirements of Low DI. The intended influence must be aimed at 2/3 of the activity's output. Moreover the values of at least one of the DI-affecting factors should be "fairly high".

Low DI. One or more of the following conditions shall apply:

a) Influence aims at complete, very high or high overlapping for more than 1/4 of the total output of the activity. The number of elements in the controlling set shall be at least 3—4 times as great as the number in the chosen set and not more than 10 times as great.
b) Influence aims at indirect effects with regard to at least half of the total output of the activity and its penetration is more than "slight".
c) Intentions apply that do not rank DI as Medium High, because too small a part of the activity is involved and the requirements concerning the values of the DI-affecting factors are not fulfilled.

The values of the DI-affecting factors may be high or low.

No or Very Low DI. Intended influence is wholly lacking, or does not reach the level required for Low DI.

According to the above definitions we have to be able to classify the values of DI-affecting factors as "high" or "fairly high" and the penetration of the intention to exert indirect influence as "slight". I have not formulated general criteria for deciding these questions, but an account of my evaluations for those activities that are classified will be found in appendices 5: 3 and 5: 4.

Description of Decision Integration in the Real Systems

The methods used for ranking and classifying of decision integration have been presented in the previous section and in the report on the empirical study in appendices 4: 1 and 4: 2. In appendices 5: 3 and 5: 4 can be found the bases for the ranking and classifying of each activity. In this section I shall present only the final result together with one detailed example of how the result was achieved. The example refers to the activity *choice of assortment,* dimension *identity of article.*

For results of the ranking and classification, see tables 5: 1 and 5: 2, pp. 90 f.

Ranking of Decision Integration in Choice of Assortment

Indicating the Elements. The activity *choice of assortment* is described in the dimension *identity of article.* The element of the sets is an article. With regard to branded goods, two items represent two different articles if they cannot both be bought from the same supplier as part of the same "order line". As regards non-branded goods, every "order line" on every supplier's order form represents a separate article. (Cf. Kihlstedt, 1961, p. 39.)

Ranking of Intended Decision Integration in the Activity. Schedule 5: 3

shows how the different types of intended influence operate in the various systems. Schedule 5:4 explains the various assortments referred to in the formulation of the controlling sets. The assortments are of different types and belong to different levels in the various systems. Schedule 5:5 describes the different kinds of contact between CC and RC at which control information, aimed at indirect influence, is transmitted. With reference to the schedules 5:3—5:5 and the information contained in comments below, intended DI is ranked: 1. FII, 2. PII-R, PII-W, 4. NII.

FII is ranked above PII-R because:

a) In FII influence is aimed at complete overlapping of the whole retail assortment in CC_{11}'s assortment, while in PII-R the aim is very high overlapping for part of RC's assortment in CC_{21}-and central warehouse assortment.

b) The controlling set for comparable parts of the assortment is smaller in FII than in PII-R; 2000 (3000 for large RCs) in FII compared with 3300 in PII-R. (Note that some perishable merchandise types are included in the FII assortment but not in PII-R). At the same time the number of articles in equivalent RCs in FII and PII-R is roughly the same.

The difference between systems according to (a) and (b) is so great that the lower frequency of contact occasions in FII (i.e. indirect influence intention is less penetrating) is not important. Moreover the indirect influence intention is wider in FII because the whole assortment is included.

PII-W is ranked above NII because:

a) Overlapping is meant to apply to a greater part of the retail assortment. (In the PII-W system but not in NII are bakery products, meat and cooked meats included in the DI intention.)

b) The intention to exert indirect influence has greater width in PII-W since it embraces all groups of merchandise and not only those stored in CC_{31}; it also penetrates considerably deeper as a result of regular group meetings and information circulars.

c) Higher overlapping (of the controlling set) is intended for SP articles in PII-W, and the controlling set embraces a considerably larger number of articles.

I have considered these factors to weigh more heavily in the ranking than the fact that the number of articles in the NII wholesale assortment is lower than in PII-W (2600 as against 3100). This difference also appears less important if we make the reasonable assumption that, since the average size of store is 40 % greater in PII-W than in NII, the average number of articles per store is likely to be greater too, i.e. the chosen sets are probably on an average larger in PII-W.

PII-R and PII-W have been ranked equal because:

a) The intended influence can be described in the same way in both cases.

(Text continues on page 98.)

Schedule 5: 3 *Description of Intended Influence in the Systems*
The numbers after the assortment refer to schedule 5: 4, pp. 92 f.

System	Overlapping intention	Indirect influence intention (see schedule 5:5 for description of contacts between CC and RC)
FII	a) Complete overlapping of retail assortment (*8*) in CC_{II} assortment (*7*) b) Complete overlapping of assortment for SP activities planned by CC (*6*) in RC's SP-assortment (*9*) c) Very high overlapping in the retail assortment (*8*) of that subset of the national assortment (*1*) consisting of the system's own distributor brands (i.e. "private brands")	RC's selection from the CC_{II} assortment should be made in acc. with the criteria *rate of turnover* (the ratio of sales to stocks) and *gross contribution* (if added contribution necessary, acc. to budget results) and after taking into account product information from CC.
PII-R	a) Very high overlapping of part of the retail assortment, (subset of (*11*), in the CC_{II}-assortment (*9*) and the central warehouse assortment (*5*). The subset of the retail assortment concerned consists of articles of the groups of merchandise included iu (*5 and 9*) b) Very high overlapping of the assortment for SP activities planned hy CC (*8*) in RC's SP assortment (*12*). c) Very high overlapping of the assortment in own manufacturing units (*2* and *6*) in the retail assortment (*11*). d) High overlapping of assortment acc. to general agreement (*7*) in the retail assortment (*11*).	RC's *choice of assortment* should take into account various kinds of product information from CC. The danger of great depth of assortment should be specially noted.
PII-W	Analogous with PII-R. Intention (c) is lacking.	Analogous with PII-R
NII	a) Very high overlapping of part of the retail assortment (subset of *8*) in the wholesale assortment (*5*). The subset of the retail assortment concerned consists of articles of the groups of merchandise included in (*5*) b) High overlapping of the assortment for SP activities planned by CC (*7*) in RC's SP assortment (*9*)	RC should take note of CC's product information which is transmitted chiefly in CC's activity *selling/order receival* and which is usually coucerned with purchase prices, margins and sales from CC.

Table 5: 1 *Ranking of the Decision Integration of Retail Activities Between Systems*

Activity	FII	PII-R	PII-W	NII
Choice of assortment	1	2.5	2.5	4
Choice of suppliers	1	2.5	2.5	4
Ordering	1	2	3	4
Pricing	1	2.5	2.5	4
Sales Promotion	1	2	3	4
Service	1	2.5	2.5	4
Payment routine (purchases)	1	4	2	3
Payment routine (sales)	1	3	2	4
Goods receival	1	2	3	4
Prepackaging (perishables)	1	2.5	2.5	4
Price marking	1	2	3	4
Positioning of goods/refilling of shelves	1	2	3	4
Storing	1	2	3	4
Checking out	1	2.5	2.5	4
Acquisition of capital	1	2	3	4
Establishing stores	1	2	3	—
Closing down stores	1	2.5	2.5	4
Acquisition of managers	1	2.5	2.5	4
Acquisition of other personnel	1	2.5	2.5	4
Acquisition of material	1	2.5	2.5	4
Training	1	2	3	4

Table 5: 2 *Classification of the Decision Integration of Retail Activities in the Systems*[17]

(Activities in FII for which the distance FII—PII is more than one class are marked with an asterisk)

Class	FII	PII-R, PII-W	NII
Full DI	Payment routine (purchases)* Payment routine (sales)* Acquisition of capital* Establishing stores		

[17] No new stores were established during the period covered by the empirical study in the NII-system. In all systems *prepackaging*, *acquisition of material* and *training* have been left out because the bases for classifications were insufficient.

Table 5: 2 (cont.)

Very High DI	Choice of assortment Choice of suppliers Pricing* Sales Promotion Goods receival Price marking* Acquisition of managers* Acquisition of other personnel*	Establishing stores (PII-R)	
Medium High DI	Ordering Positioning/re-filling* Storing Checking out	Choice of assortment Choice of suppliers Ordering Sales Promotion (PII-R) Payment routine (purchases) Goods receival Establishing stores (PII-W) Acquisition of capital (PII-R)	Choice of assortment Payment routine (purchases)
Low DI	Service	Sales Promotion (PII-W) Payment routine (sales) (PII-W) Price marking Checking out Storing Acquisition of capital (PII-W) Acquisition of managers	Choice of suppliers Ordering Sales Promotion Goods receival Acquisition of capital
No or Very Low DI		Pricing Service Payment routine (sales) (PII-R) Positioning/re-filling Acquisition of other personnel	Pricing Service Payment routine (sales) Price marking Positioning/re-filling Checking out Storing Acquisition of managers Acquisition of other personnel

Schedule 5:4 *Assortments which, as Chosen or Controlling Sets, are Directly or Indirectly Included in CC's Formulation of Intended Influence.* The letter "C" indicates that the assortment is included in some controlling set and does not, as such, represent a chosen set. Numbers indicate the number (in round figures) of articles in the assortment, excl. non-food articles not generally included in groceries.

Component[18]	FII	PII-R	PII-W	NII
CC_{18}	1. National assortment, groceries etc. (C, 2,500) 2. Standard assortment for vegetables and the system's own manufacturers of bakery products, meat and cooked meats, (C) 3. Assortment in national warehouse for delicatessen (700)	1. Assortments of suppliers who have entered into a general agreement at the CC_{13} level (C) 2. Assortment in own manufacturing units 3. Imported assortment for sales to CC_{21}	1. Assortments of suppliers who have entered into an agreement with CC_{23} (C) 2. Imported assortment for sales to CC_{31} 3. Vegetables assortment for sales to CC_{31}	1.—3. See PII-W
CC_{12}	4. Regional warehouse assortment which is a subset of *1* with some regional additions (1,900) 5. Own manufacturers assortment for bakery products and meats 6. Assortment for SP-activities planned by CC_{12} which is a subset of *4 and 5* (C)	4. Assortment for CC_{21} (C, 2,800) 5. Central warehouse assortment for CC_{22} (500) 6. Assortment in own manufacturing units; subset of *4*. 7. Assortment of suppliers who have entered into a general agreement for meat and cheese without selling through CC. (C) 8. Assortment for SP-activities planned by CC_{12}. This assortment is a subset of assortments *4* to *7* (C)		4. Grocery assortment acc. to preprinted order form (C)

CC_{11}	7. "CC_{11}-assortment" consisting of *4 and 5* and for large RCs also *3* above, plus additions indicated by CC_{11} embracing the whole or part of the assortment of external suppliers approved by CC_{11}. The CC_{11}-assortment embraces all groups of merchandise (C, 2,000; 3,000 for large RCs)	9. "CC_{21}-assortment" stored at CC_{21} consists of assortment *4* with a few alterations (2,800) 10. Specially ordered articles[18]	4. Wholesale assortment (3,100) 5. Assortments of suppliers who have entered into a general agreement for bread and cheese without selling through CC. (C) 6. Specially ordered articles[19] 7. Assortment for SP-activities planned by CC which is subset of *4 and 5*. (C)	5. Wholesale assortment (2,600) 6. Specially ordered articles[19] 7. Assortment for SP-activities planned by CC which is a subset of *5* and the assortment of some suppliers of perishables outside the system (C)
	8. Retail assortment 9. SP-assortment, which is a subset of *8*	11. Retail assortment 12. SP-assortment which is a subset of *11*	8. Retail assortment 9. SP-assortment which is a subset of *8*	8. Retail assortment 9. SP-assortment which is a subset of *8*

[18] In case it represents a chosen set the assortment is assigned to the component carrying out the activity and if it represents a controlling set, to the sender of control information.

[19] These are articles not included in stocks or on order forms but which individual RCs can order through CC_{11}. New articles "on trial" are included in the normal assortment.

Schedule 5: 5 Contacts Between CC and RC at which Control Information Aimed at Indirect Influence on the Choice of Assortment is Transmitted

Type of contact	FII	PII-R	PII-W	NII
Group meetings	With an average frequency of twice every 3 month, meetings between RC and CC at which among other things, CC comments on sales program.	Group meetings about once every 3 months at which typical points coming up for discussion are: information from CC on sales program, distributor brands, and topical merchandise group.	Small "action gronps" of RC owners/managers meet abont once a month. Assortment problems sometimes but not always discussed. CC's information usually channeled via group leaders or external specialists working on CC's account.	"Customer meetings" one day a year, arranged by CC, at which at least one item on the agenda generally concerns product information
Personal contacts with individual RCs	Store visits by consultants or sales managers often concerned with assortment information, in particular sales program. Frequency of visits varies depending on the adjudged need of the stores for information. Average for transmission of assortment information about once every 3 months.	All RCs except the very smallest are visited by sales consultants on an average once or twice every 3 months. On almost every visit the transmission of assortment information is an essential part of the consnltant's job.	Cash-and-carry cnstomers and CC's cash-and-carry personnel are in personal contact every week. Product information about at least one article generally comes into the discussion. The store consultant visits RC on an average about once every 3 months. Assortment information is then often transmitted.	Most non-cash-and-carry customers are visited by CC's representative on an average once or twice a year. CC is in personal contact with cash-and-carry-customers every week.
Telephone and store radio transmission	Every week information about the sales program is sent over the radio. For the ordering of perishables RC receives information intended to exert indirect influence at least once a week. Corresponding information about non-perishables is less frequent.	The frequency of information intended to exert indirect influence and transmitted during telephone ordering is probably higher than in FII (acc. to a comparison of the job-descriptions for order personnel in PII-R and FII). A smaller part of the perishable assortment is covered in PII-R than in FII.	Same as PII-R	Same as PII-W but a smaller part of the perishable assortment is covered in NII than in PII-W.

Written information	Every week comments appear in a circular on articles included in the sales plan and on certain articles new to the assortment.	Weekly information circulars about new products and about products included in SP activities planned by CC.	Information about new products and products incl. in various manufacturers' campaigns appear in a special weekly circular comprising several pages. After every meeting of the "action groups", CC comments in special circulars on the assortment problems discussed. Another special weekly circular comments on products in the central SP program.	Information intended to exert indirect influence is provided in special circulars on a few campaign articles, with low frequency. Information given each week about which products are included in centrally planned SP. These circulars cover far fewer articles than equivalent circulars in PII-W.

Schedule 5: 6 *Description and Ranking of DI-Affecting Factors for Choice of Assortment*

Factor	Ranking	FII	PII-R	PII-W	NII
System of rewards	1. FII 2. PII-R 2. PII-W 4. NII	Administrative evaluations of deviations from CC's intended influence can affect the promotion etc. of the store manager in the system. The evaluations are chiefly concerned with budget results (sales and inventory), follow-up of SP activities, and the existence of external suppliers not approved by CC. There are also economic rewards in the shape of price differentiation in relation to annual purchases from CC_{12}'s assortment and wage conditions related to sales volume and budget results.	Annual bonus as a percentage of RC's internal purchases rises progressively. Special quantity discount for SP articles. Expulsion from the system can be inflicted if purchases from CC fall short of 20 % of RC's sales. Low DI values can affect CC's evaluation of the owner/manager's suitability for "promotion" in the system (when establishing new stores) and/or for receiving financial help from CC.	No special quantity discount for SP articles nor any rule for expelling members with low percentage of internal purchases. But the cooperative contract does allow expulsion for failure to follow-up SP activities sufficiently. Otherwise same as PII-R.	Annual progressive bonus on purchases from CC_{41}'s assortment. RC's percentage of internal purchases can sometimes affect evaluations of his suitability as a recipient of financial help. Cases of new establishment and rebuilding much more rare than in PII.
Review information	1. FII 2. PII-R 3. PII-W 4. NII	Order routine at internal CC-suppliers provides information about RC's purchases there. CC_{11} attests all invoices for suppliers not billing through CC_{12}. Budget results for every RC (sales and inventory) are registered. Merchandise type statistics, compiled by CC_{12}, cover all RCs. Stock lists for all RCs are available at CC_{11}. Order forms for SP items at CC_{12}. Store visits by consultant.	Order routine at internal CC-suppliers provide information about the articles RC buys at each order. For some newly established RCs and other RCs where CC has big financial commitments, CC follows the sales and inventory budgets and receives inventory lists. Proportion of sales from CC are calculated once a year for all RCs. Developments in absolute purchases from CC is followed every month by CC and comments are sent to RC. Order forms for SP items at CC. CC tries to follow main lines of RC assortment development, at least in larger RCs, through consultant visits to stores. Random checks on SP follow-up occurs but only occasionally.	Compared with PII-R, PII-W has a far less developed consultant organization for collecting information about RC's choice of assortment. Otherwise no difference.	Order routine provides information as for PII-R. In principle, individual RC's proportion of internal purchases is followed in same way as in PII but there is less information on RC's sales development. There is no consultant organization but representatives get some information about RC's choice of assortment at short, very infrequent visits to stores. Infrequent, random checks on SP. Order forms for SP items can be checked by CC.

External information	1. FII 2. PII-R 2. PII-W 2. NII	Manufacturers' representatives must have permission from CC_{II} to visit RC. Permission is given only to suppliers whose products form part of "CC_{II}- assortment" and only for articles included in it. Permission is given for limited periods only and are mostly issued for large RCs. Much of the manufacturers' information in FII can therefore be regarded as support for CC's control information.	CC cannot exclude manufacturers' visits to RC but does try to discourage them from selling to RC articles outside the assortments of internal and cooperating suppliers. Manufacturers' visits seem to vary very much according to the size of the RC. Information from consumers about their own desires regarding choice of product is received in all systems. Consumer information has not affected rankings.	Same as PII-R. No data pointing to any differences between the PII and NII systems came up at the interviews.	Same as PII-R.

The only difference is that PII-W lacks own manufacturing units but articles carried by these units represent only a very small subset of the chosen sets in PII-R.

b) The number of articles in the comparable sets—CC_{21} assortment + central warehouse assortment in PII-R and the wholesale assortment in PII-W—are practically the same size (3300 and 3100). No information is available about the number of elements in other controlling sets, but any difference there might be would probably not be so great as to alter our conclusion that the sums of the number of elements in the relevant controlling sets are much the same size.

c) According to schedule 5: 5 both the penetration and the width of the intended indirect influence seems to be roughly the same in the two cases.

Ranking of Decision Integration. The DI-affecting factors are described and ranked in schedule 5: 6. Because the *choice of assortment* is by definition always executed by RC, only three factors are relevant here. I shall comment on a few aspects of the rankings only which may not be immediately clear from the schedule.

FII is ranked above PII-R for *rewards system* for the following reasons. The administrative evaluations will generally have greater personal consequences for managers and personnel in FII. FII's budgeting system provides CC with better opportunities for rewarding RC's follow-up of the intended indirect influence. Administrative sanctions, in the form of expulsion of RC from the PII-system, only applies in extreme cases of deviation from intended behavior. PII-W and PII-R rank equal for *rewards system,* although PII-W has no special quantity discount for SP-orders. This discount can amount to 12 % for big orders, but the mere existence of an SP-article brings only very slight reward. Moreover SP-articles are only a small subset of the chosen set for the activity *choice of assortment.* PII-R is ranked above PII-W with regard to *review information,* because of the less frequent visits of CC's consultants to the store in PII-W.

According to schedule 5: 6, FII is ranked above the other systems for all three factors. PII-R ranks equal with PII-W for two factors and above for one factor. NII ranks below the other systems for two factors and equal with PII for one factor. Applying the rules mentioned above (p. 85) we find that the ranking of decision integration is the same as the ranking of intended decision integration, i.e. 1. FII, 2. PII-R, PII-W, 4. III.

Classification of Decision Integration in Choice of Assortment

FII. The intended influence that will have the most effect on the degree of DI is that designated as (a) in schedule 5: 3, i.e. complete overlapping of the retail assortment in the CC_{11}-assortment. This influence is aimed at the whole activity. The other types of intended influence described in this schedule only have the effect of raising the degree of intended decision integration already

established by (a). The controlling set according to (a) consists of about 2000 elements (articles) in the case of small and medium sized stores and 3000 in the case of large ones. The chosen set embraces approximately 1500 to 3000 articles, depending on the size of the store. On an average, therefore, the controlling set contains less then 25 % more elements than the chosen set. I judge two factors—review information and external information—as showing high values in schedule 5: 5. *FII is therefore classified as having a Very High DI.*

PII-R. The criteria for Very High DI are not fulfilled here, since the controlling set for groceries and certain perishables (*5* and *9* in schedule 5: 4) coutains 3300 elements which on an average is considerably over 25 % more than the number of elements in the relevant subset of the chosen set (retail assortment for these groups of merchandise). Admittedly the effects of indirect intended influence, and the aim towards overlapping for SP articles, raise the degree of intended decision integration but not sufficiently to meet the criteria for Very High DI. Moreover the relation between the number of elements in the chosen and controlling sets for those perishables covered by CC assortments (*5* and *9* in schedule 5: 4), indicates a lower intended DI for these groups of merchandise than for groceries etc. The criteria for Medium High DI are fulfilled since groceries etc. comprise more than 2/3 of the activity and since the controlling set for these merchandise groups is clearly less than three times as large as the chosen set. (The size of the activity is measured in number of articles.) Furthermore the values of two factors—rewards system and control information— as they are described in schedule 5: 6, are judged to be fairly high. *PII-R is therefore classified as having a Medium High DI.*

PII-W. The description of this system is so like the previous one—in intended influence, in the sizes of controlling and chosen sets and in the DI-affecting factors—that further comments are not necessary. *PII-W is also classified as having a Medium High DI.*

NII. NII has been ranked below the PII systems but has nevertheless also *been classified as having a Medium High DI.* The most important controlling set (the wholesale assortment, *5* in schedule 5: 4) is relevant for at least 2/3 of the activity and is clearly less than three times the size of the chosen set for the relevant groups of merchandise. Two DI-affecting factors—rewards system and review information—show lower values than in PII, but I still judge them to be sufficiently high to satisfy the requirements of Medium High DI.

Relationships Between Decision Integration and Institutional Integration

Table 5: 1 shows a very high positive correlation between the rankings of decision integration and those of institutional integration. How can this correlation be explained? Is it a logical necessity, springing from the way the two

concepts have been defined, or must we seek some other type of explanation?

The *degree of institutional integration* refers to the strength of the influence on the decision process of the controlled component that *can or must be* the result of the institutional relations (see p. 46). The relation to the operationalization of the concept of decision integration, inherent in the definitions, lies in the fact that institutional relations affect three DI-affecting factors, namely execution by CC, rewards system and review information.

In cases of full institutional integration there will be legally established rules about the disposition of resources (e.g. means of payment, real and movable estate) and about entering into contracts with external components. This means that CC must carry out certain subactivities of some activities in the *acquisition and transformation of resources* group.

The *system of rewards,* in FII particularly but to some extent in PII as well, is based on institutional relations. In the FII system the *review information* that CC receives (through payment routines, accounting and internal auditing) is imposed at least partly by the requirements of the institutional relations (e.g. because in systems consisting of a single legal entity there may be legal rules for accounting systems etc.).

Except where institutional relations *necessitate* the execution of an activity by CC, a higher degree of institutional integration in a system A than in a system B does not by definition mean that there must also be a higher degree of decision integration in A. Below I suggest some tentative explanations of the correlation between institutional and decision integration.

a) *The efficiency of the decision process, under different decision integration conditions, can be affected by the institutional integration.* (The concept of the *efficiency* of the decision process will be discussed more fully in chapter 8. In brief, if costs of the decision process are reduced and/or the goal fulfilment improves, we can say that efficiency has increased.) A high degree of DI may require high values for one or both of the two DI-affecting factors system of rewards and review information. It may cost more to achieve these high values in PII than in FII, because of the relation between institutional relations and these DI-affecting factors discussed above. Admittedly the cooperative contracts in PII often do contain some rules about the necessity of information exchanges between RC and CC, and about various rewards and sanctions, but it will probably cost more to apply these rules in PII than in FII.

b) *A change in institutional integrntion can represent an adjustment to an earlier change in decision integration.* According to this explanation, the change in DI is the primary change. Establishing institutional relations of a type which could facilitate an increase in DI in a system might prove more difficult than establishing relations that are in themselves an adjustment to some previous change in DI. (Certain observations, which I need not specify here, seem to suggest that in Sweden the rise of the voluntary

chains in the food trade over the past ten years was preceded by a period of increasing decision integration in the then NII systems.)

c) *The various rules of behavior imposed by institutional relations,* even if they are not absolutely obligatory or closely tied to a system of rewards, *can affect behavior* in such a way that a high degree of decision integration results. An example: the general recommendations of the PII agreements about cooperation, follow-up of CC's intentions, exchange of information between RC and CC, etc.

d) *The degree of DI that appears desirable to CC may vary according to the institutional integration of the systems concerned.* The different attitudes may be motivated on ideological and/or economic grounds. An example of possible ideological grounds could be a positive view of the "free entrepriser" in the PII and NII systems. Economic reasons could, for example, be represented by different attitudes to the relation between DI and efficiency, different attitudes to the efficiency of the system versus the efficiency of the component, etc. At full institutional integration each RC's economic result will directly affect CC's financial position—a relationship that may induce CC to try to control RC's activities to a large extent.

Chapter 6
Execution Integration

The third main type of integration variable is concerned with integration in the execution of activities. In the present chapter I shall first define four variables expressing different aspects of execution integration (EI) and discuss the a priori relations between them (i.e. relations that follow from the definitions). The various concepts are then operationalized; the results of the measurements are reported below. We shall find that, according to these measurements, there is a high correlation between the rankings of the EI variables. I shall discuss some tentative explanations of this. The chapter concludes with a section on a priori relations and empirically found correlations between EI variables on the one hand and decision- and institutional integration variables on the other.

Execution integration is concerned with the way *activities are executed* or with characteristics of *flows*. We have seen in chapter 5 that decision integration, as an attribute of the system as a whole, has to be expressed as an aggregation of decision integration between the controlling component and each of the controlled components. The EI variables, on the other hand, always refer to attributes of activities or flows in the system as a whole.

My choice of EI variables has been geared to three requirements:

a) The concepts should correspond, at least approximately, to the general and marketing definitions of integration presented in chapter 3.
b) Definitions of the EI variables should contain no reference to efficiency variables or decision integration.
c) No EI variable should be so closely related by definition to any other, that its function in the system of concepts could be fulfilled by the other variable.

The EI variables I have chosen are: *activity transference, internalization, exclusiveness* and *homogeneity*. Some other variables, which I considered, satisfied the first of the above criteria but not the second. ("Coordination" had to be abandoned on this account.)

Definitions of the EI Concepts

Activity Transference

Characteristic of the marketing system is that work is divided among the components. The division of marketing activities into wholesale and retail activities can be said to refer to a "normal" situation, in which retail components

carry out only retail activities and central components only wholesale activities. Deviations from this pattern can then be described as the transfer of an activity from one "level" to another. Of the definitions of integration quoted above (pp. 38 ff), *D*, *G* and *I* are clearly related to the concept of activity transference.

Activity transference is defined as the ratio between the transferred and the total extent of the internally executed activity. Note that the allocation of the decision process to different levels in the system is not included in the definition.

The extent of the activity is defined in terms of the cost of production factors used i.e. as input into the activity (p. 21). I have chosen input into—rather than output from—an activity as a measure of its size and its allocation in the system, for two reasons:

a) When we later (in chapter 9) come to analyse the relation between activity transference and efficiency, our discussion can be related more closely to microeconomic theory, since changes in activity transference can directly affect the quantity of production-factor input per acting component.
b) It may be difficult to define the output of the various subactivities in the same terms. In the *sales promotion* activity, for example, output from the subactivities *transmitting advertising information* and *manufacturing display material* can hardly be meaningfully expressed in the same terms, if we want to indicate how much of the total activity is carried out at different levels in the system.

The variable *activity transference* can exhibit values between 0 and 1. A value of 1 for a particular retail activity would mean that the activity is carried out entirely by central components and, for a particular wholesale activity, that the activity is carried out entirely by retail components.

The allocation among activities and components of the cost of production factors used in the system, naturally involves difficult problems. These problems are discussed in the literature of cost analysis. It is not part of my present purpose to discuss them (p. 21).

In measuring activity transference (also internalization, see below), we have to be able to distinguish the part of the activity executed internally from the part executed outside the system. In other words, how can we decide whether a particular production-factor unit is part of an internal or an external component? What shall we do, for instance, when an internal component hires the necessary resources (consultants, automobiles, machines etc.) instead of employing or owning them? If almost all the resources of an external component have been hired by an internal component and used almost exclusively for carrying out the system's activity during the period concerned, I count them as internal resources. Otherwise they are external.

Internalization

Marketing activities are performed inside and outside the system. To create a flow of goods to the consumer sector from the system's RCs, certain wholesale or retail activities will also, in varying degrees, be required of certain external components (e.g. external suppliers, service firms, financing institutions).

The concept of *internalization* measures the proportion of a particular marketing activity that is carried out by internal components. We have seen that the concept of activity transference expresses an aspect of the division of work within the system; similarly, the concept of internalization expresses an aspect of the *division of work between system and environment.*

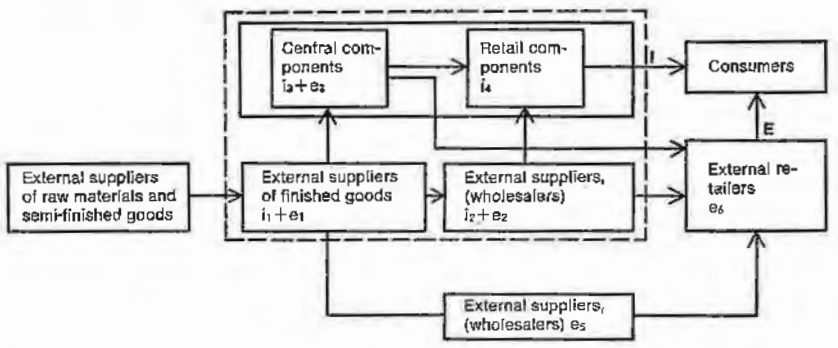
The concept of internalization has more or less explicit equivalents in parts of the definitions *A, D, G, H* and *I* (pp. 38 ff), and in the literature on *external economies* (cf. Thorngren, 1967).

The internalization of an activity is defined as *the ratio between the value of the production factors used by the system's components and the value of all the production factors used inside and outside the system* for the "relevant parts" of that particular activity.

We can discuss what is meant by the "relevant parts" of the activity by referring to figure 6: 1. We start with flow *I,* i.e. the flow of goods from the system to the consumer. If we follow the flow of goods backwards, through the components involved in the marketing and manufacturing of finished goods, we come to components supplying semi-finished goods or raw materials. The

Figure 6: 1 *Model of the Marketing System and Part of its Environment as Used to Illustrate the Concept of Internalization*

Thick solid lines separate the components of the system from the environment
Broken lines define the part of the environment that is relevant to the internalization concept
Arrows indicate the flows of goods
I = flow of goods from the system to the consumer
E = flow of goods from external retailers to the consumer
i_i and e_i = valne of production-factor inputs in the components represented by the boxes, for the part of a particular activity, A, that is directly of indirectly linked to flow I and flow E respectively



"back" boundary for activities to be included in the relevant part of the environment has been set at the components which manufacture the finished goods (the broken line in figure 6: 1).

External components have been included in the relevant part of the environment if the components concerned are involved, directly or indirectly, in flow relations with internal components. Components among suppliers, service firms, financing institutions etc. are thus included if they have flow relations with the system's components in connection with the activity in question. In figure 6: 1, for example, external wholesale units who act as suppliers to the system have been included, while components whose flow relations are with external retailers *only* have not. Also, by definition, any consumer takeover of retail activities has to be excluded according to the conditions we have assumed in chapter 2 (p. 17).

In the part of the environment thus defined (indicated by the broken line in the figure) a certain part of the activity is carried out to get goods flowing between external retailers and consumers. This part of the activity in the external components is not included in the internalization concept; nor is that part of the activity that is carried out by internal components but is concerned with flows to external retailers.

In terms of figure 6: 1 this means that the total value of all the production factors used inside and outside the system for the relevant part of the activity is: $i_1+i_2+i_3+i_4$. Internalization is expressed as the share of this total amount that is executed internally (i.e. i_3+i_4). Thus internalization is defined as $(i_3+i_4)/(i_1+i_2+i_3+i_4)$.

An example: Let the activity be *price marking*. Consider then the inputs required of the external manufacturer and wholesale components and the internal wholesale and retail components, for *price marking* goods for *distribution through the system's RCs*. Internalization will measure the share of the total inputs that is used by internal components.

In the case of activities relating to the flows of information, payments or production factors, the relevant part of the activity is determined by the direct or indirect relation of these flows to the goods flow from the system's retail components.

An example: A manufaturer's advertising of his own brand is included in the relevant part of the *sales promotion* activity, if the goods are sold by the system's RCs. The manufaturer's total advertising costs will not be included, however, if his advertising is also geared to the flows of goods from external retailers. The relevant part of his total input in advertising concerns advertising directed towards consumers who buy the advertised articles from the system's RCs.

As in the case of activity transference (see above), various problems of a general nature arise when we try to evaluate production-factor inputs and allocate costs. Whether or not the execution of a particular activity takes place

inside or outside the system is a problem that has also been discussed in the context of activity transference.

Exclusiveness

I have already identified the flows that link internal components to each other and to components in the environment (pp. 14 ff). A particular flow relation can thus link either two internal components or an internal and an external component. If we sum up the quantities of a certain kind of flow, *exclusiveness measures the share of this kind of flow which has internal components at both the sending and the receiving ends.* Thus exclusiveness is a measure of how "*open*" the system is in certain respects for flows to or from the environment. The greater the exclusiveness, the less "open" the system. Of the definitions in chapter 3 only A, and to some extent B, include any direct reference to the idea of the exclusiveness of flows.[1]

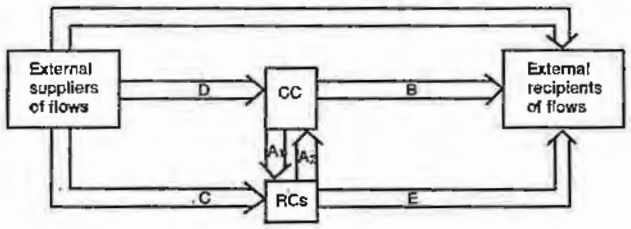
I shall define exclusiveness for the flows of goods, information, payments and production factors. The definitions will vary according to the type and direction of the flow concerned. Figure 6: 2 provides illustrations. In the definitions I assume one CC in the system.

Goods Flows

The quantity of the flows is measured in terms of its monetary value at a uniform price level (e.g. retail price level). Exclusiveness can apply to flows from CC and to flows to RCs. In the former case it tells us how much of CC's goods flows is directed to internal components; in the latter how much of the goods flowing into RCs have come from internal suppliers.[2] In figure 6: 2 below, $A_1/(A_1+B)$ designates the *exclusiveness of the goods flows from CC* and $A_1/(A_1+C)$ the *exclusiveness of the goods flows to RCs.*

Figure 6: 2 *Internal and External Flows Illustrating the Concept of Exclusiveness*

Arrows indicate the flows, which are identified by letters



[1] The concept of exclusiveness is clearly related to the analysis in Nyström (1967), where the aim is to construct a general method for delimiting systems of components whose activities are in some way similar.

[2] Cf. pp. 30 ff where criteria for delimiting the system are discussed in similar terms.

Payments Flows

Three types of payments flow are distinguished: payments for goods, for investments and for profits (or losses).

Payments Flows for Goods. These flow in the opposite direction to the flows of goods. The *exclusiveness of the payments flows to CC* is designated: $A_2/(A_2+D)$ and *from RCs* $A_2/(A_2+E)$.

Payments Flows for Investments. Here exclusiveness is a measure of the proportion of the total cost of investments that is not financed by external components. *Exclusiveness of payments flows for investments in retailing* is thus: (E—C)/E.

Payments Flows for Profits (Losses). Profit accruing to a component as a result of its activities can either stay within the system (e.g. as an increase in the bank balance) or be passed on to an external component (e.g. as owners' cash withdrawal not reinvested in the system). In the same way a deficit can be met by resources within the system (e.g. by reducing the bank balance) or outside it (e.g. from an owner or a financing institution). *Exclusiveness of payments flows for profits (losses) in RCs* measures the proportion of the profit (loss) that corresponds to payments flows not going to (coming from) external components. This variety of the exclusiveness concept cannot be illustrated by fig. 6: 2.

Production Factors Flows

I have divided these into the flows of manpower, materials and premises. Manpower can also be transferred between components on the same level in the system, which means that the two boxes (CC and RCs) in figure 6: 2 symbolize any combination of component pairs in the system. The *exclusiveness of the flows of manpower to all the components* in the system refers to the proportion of all personnel new to the components during the period concerned that has come from other components in the system. According to figure 6: 2: $(A_2+A_1)/(D+A_2+C+A_1)$. The *exclusiveness of the flows of manpower from all the components in the system* is expressed by the ratio: $(A_1+A_2)/(B+A_1+E+A_2)$.

The *exclusiveness of the flows of materials* is indicated in the same way as the goods flow to RCs, i.e.: $A_1/(A_1+C)$.

The *exclusiveness of the flow of store premises into the system* tells us how great a part of the store premises accruing to the system during the period concerned originally "entered" into the system because CC obtained the right of disposition to the premise: $(A_1/(A_1+C)$. The *exclusiveness of the flow of store premises from the system* tells us how great a part of the store premises "dropping out" of the system for which the right of disposition is not passed on to a competitor. If full decision integration applies in the activity *closing down stores,* however, the exclusiveness is always complete. This exclusiveness concept cannot be adequately described by fig. 6: 2.

Information Flows

The quantity of the information flows is defined on the semantic level. Only information flows resulting from the *execution* of the activity have been included here, since exclusiveness is an EI concept. The following measures seem pertinent:

a) The exclusiveness of *CC's transmission of information,* $A_1/(A_1+B)$. Example: Information from CC to RCs connected with *selling/order receival* as a ratio of the *total* information flow from CC for this activity.
b) The exclusiveness of *CC's information receival,* $A_2/(A_2+D)$. Example: Information received by CC from RCs as a ratio of the total information flow in connection with the above activity.
c) The exclusiveness of *RCs' transmission of information,* $A_2/(A_2+E)$. Example: In connection with RCs' *ordering* activity, that part of the information that is transmitted to CC.
d) The exclusiveness of *RCs' information receival,* $A_1/(A_1+C)$. Example: In connection with the *training* activity, that part of the information that comes to RCs from CC.
e) The exclusiveness of the *whole system's transmission of information,* $B/(B+E)$. Example: Regarding information transmitted in connection with supplier negotiations that constitute subactivities of the wholesale and retail activities *choice of suppliers,* that part of the information that is transmitted by CC.
f) The exclusiveness of the *whole system's information receival,* $D/(D+C)$. Example: Regarding information received in connection with supplier negotiations as above.

Homogeneity

Even a superficial comparison of real marketing systems will reveal a widely varying range of uniformity in the behavior of components within individual systems. For instance, in one system prices may vary greatly from store to store and in another hardly at all. In one system similar assortments appear in all the stores, in another many articles are carried only by a few. I have developed the homogeneity concept to provide some measure of the uniformity of the components with regard to a particular activity. Definitions *E* and *F* in chapter 3 recognize some such idea of homogeneity. To identify homogeneity we have to compare the specifications of the action alternatives in the different components or, in other words, the chosen sets describing the respective activity dimensions.

The elements of the chosen set can be identified as values of either a *quantitative variable* (e.g. price) or a *qualitative variable* (e.g. technique). In the former case homogeneity can be defined by applying the concept of relative dispersion in a statistical distribution. In the latter, homogeneity will be given a set theory definition.

The Elements are Values of a Quantitative Variable

Assume first that every chosen set consists of one element. Example: the chosen set in the activity *choice of assortment,* dimension *depth of assortment* contains one element; a number. Homogeneity is greater, the smaller the dispersion in the frequency distribution describing the attributes of the system. I have used the relative instead of the absolute dispersion here because, since the absolute size of the element values does not affect the homogeneity measure, this provides a better basis for inter-system and inter-activity comparisons. The homogeneity variable can exhibit values between 0 and 1. Homogeneity (H) is defined:

$$H = \frac{1}{1+\sigma_x/\bar{x}}$$

where $\sigma_x/\bar{x}$ is the relative dispersion (coefficient of variation, Ferber & Verdoorn, 1965, p. 67). Homogeneity will be close to 0 if the coefficient of variation is high, and 1 when it is 0.

An example: activity *choice of assortment,* dimension *depth of assortment.* The depth of assortment is expressed as the number of articles in groups of merchandise that are the same for all components.

Store no.	Depth of assortment	
	System 1	System 2
1	2,000	1,400
2	2,100	1,600
3	1,800	3,000
4	2,200	2,000
5	1,900	
Average	2,000	2,000
Standard deviation	110	616
Coefficient of variation	0.06	0.31
Homogeneity	0.94	0.76

If the elements of the chosen set are represented by ordered pairs of a basic set and an attribute set (p. 60), the homogeneity measure is calculated in two steps. First, for each subset of the chosen set that contains only those ordered pairs for which the elements of the basic set are equal, we proceed as above with separate homogeneity calculations for the values of the elements of the attribute set. We can then calculate a weighted arithmetic mean for the separate measures, to find the homogeneity of the dimension concerned.

The example below will clarify the procedure.

The activity is *pricing* and the dimension *price per article.* According to the table below, component A's chosen set consists of the ordered pairs (I1, II1, III3) and C's of (I1, II3).

Component	Price of the Articles I	II	III
A	1	1	3
B	1	2	1
C	1	3	—
D	1	2	—

Article	Standard deviation	Arithmetic mean	Homogeneity per Article (formula on p. 109 applied)
I	0	1	1
II	0.7	2	0.74
III	1	2	0.67

Homogeneity for this dimension of the activity is calculated as an average of the homogeneity of the separate articles weighted with the number of observations per article. In this example, therefore, homogeneity is 0.83.

The Elements are Values of a Qualitative Variable

If all the chosen sets in the system are equal, we have maximum homogeneity. If no single element in any set is identical with any other element in any other set, we have minimum homogeneity. The greater the number of elements that are identical with elements in a *large number* of the chosen sets in the system, the greater the homogeneity. This argument will be developed further below, first when the chosen set contains one element and, secondly, when there are several elements in the chosen set.

One Element in the Chosen Set. When the chosen set contains *one* element only, and this is a value of a qualitative variable, *homogeneity is defined as the proportion of the system's components whose action alternatives are among the m most frequent alternatives in the system.*

An example will illustrate this: Below we have the frequency distribution for action alternatives in two systems, each with 100 components.

Action Alternative (Chosen set)	System 1	System 2
	Number of components	
a	50	20
b	20	70
c	15	10
d	15	0

In system 2 more components are clustered round the most frequent alternative than in system 1, and the components are distributed over fewer alternatives.

If $m=1$, homogeneity will be 0.5 and 0.7 respectively. If $m=2$, it will be 0.7 and 0.9.

It is difficult to lay down any general principle for choosing a value for m. If we let $m=1$, then we are ignoring the fact that the frequency of the *next* most common alternative may differ in the two systems. If m is nearly as great as the total number of existing action alternatives, then we are getting rather far from what is commonly meant by "homogeneity". The value of m will have to he decided for each case as it arises, taking into consideration among other things the total number of alternatives in the system, and the relation between homogeneity and efficiency. This last point needs some elaboration.

My main reason for introducing the homogeneity concept at all has been its probable interest for analyses of relations between integration and efficiency. It therefore seems reasonable to let the definition of homogeneity vary for different activity dimensions, so that it can be geared to whatever is most interesting from the efficiency point of view in any particular case.

An example: Efficiency in activity A may be affected chiefly by the frequency of the *most* frequent action alternatives, while the distrihution of the remaining chosen sets among remaining alternatives is quite uninteresting in the context. We should then let m be equal to 1. In activity B, on the other hand, efficiency may be affected chiefly by how large a proportion of the action alternatives chosen are among the less frequent alternatives. We should choose a value of m that is greater than 1.

To prevent our definition of homogeneity from conflicting with the general meaning of the term, m is never allowed to be chosen greater than half the total number of action alternatives in the system or in any of several compared systems. In the above example, therefore, m must be 1, since if $m=2$, it will be more than half the number of action alternatives in system 2.

Several Elements in the Chosen Set. If we compare two chosen sets, each consisting of several elements, we shall find either that some elements are identical in the two sets, or that there is no such identity. The greater the proportion of identical elements, the greater the homogeneity. If the system expands to embrace m components, some elements may be identical in all the m chosen sets, some in all except one, etc. Some elements may appear in only one set. *Homogeneity is defined as the proportion of all the elements in the chosen sets that are identical for at least k of the m sets.* If we let k/m be equal or almost equal to 1, the homogeneity measure will be very sensitive to deviating behavior on the part of single components. Furthermore such a measure does not reflect any differences there may be in the number of elements identical in *almost* all the components. If we let k/m be small, for instance less than 0.5, we find ourselves too far removed from the commonly accepted meaning of "homogeneity". The choice of k/m must be stated and discussed separately for each homogeneity calculation (see above).

An example: Assume that we are comparing the assortments of two systems.

Conditions are as follows (see figure below): each system has three components; each component's assortment, represented by a circle, contains 10 articles. The numbers in the respective subsets indicate the number of articles common to the various subsets of the chosen sets.

In system 1, 3 elements in all three chosen sets are identical; 4 elements in each chosen set are identical with one, and only one, other chosen set; 3 elements are unique to the respective chosen sets. In system 2 the corresponding figures are 7, 2, 1. System 2 is more homogeneous than system 1. In system 2, 70 % of all elements in each chosen set are identical with elements in all the other chosen sets in the system. In system 1 the corresponding figure is 30 %. In system 2, 90 % of all elements in all the chosen sets are identical with elements in at least one other chosen set. The corresponding figure in system 1 is 70 %. Accordingly we can say that homogeneity in system 1 is either 0.3 or 0.7, depending on our requirements for k/m: 0.3 if the elements are to be identical between all three components ($k/m=1$), 0.7 if we only require identity between at least two of them ($k/m=2/3$).

The definition of homogeneity, H, when the number of components is 3 and $k/m=2/3$ is as follows in set theory notation. A_i = the i^{th} component's chosen set.

$$H = \left[3 \cdot n\left(\bigcap_{i=1}^{3} A_i\right) + 2\left\{\sum_{i=1}^{3} \left[n\left(\bigcap_{j\neq i}^{2} A_j\right) - n\left(\bigcap_{i=1}^{3} A_i\right)\right]\right\}\right] \Big/ \sum_{i=1}^{3} n(A_i)$$

The above formula can easily be extended to the general case of m components with k as any number between m and $m/2$. As this general formula is rather cumbersome, and does not contribute much to the understanding of the homogeneity concept, I have not given it here.

Hitherto an implicit assumption in our discussion of homogeneity has been that activity transference is 0. If we allow CC to carry out retail activities, it is often possible to "allocate" these to the RCs concerned (e.g. *establishing stores, acquisition of capital, goods receival*). Homogeneity calculations can then proceed as before. In other cases, however, such as advertising by CC on behalf of all the RCs, it may not possible to allocate the activity among RCs in any logical or meaningful way. For such joint activities, therefore, complete homogeneity obtains for the part of the activity carried out by CC. In the case of wholesale activities, the homogeneity measure emerges from comparisons between different CCs at the same

level in the system. If RCs execute part of a wholesale activity for a particular CC, then the attributes of CC's and RC's executions will together give us the activity description for the CC concerned.

Relationships Between EI Concepts Based on the Definitions

At the beginning of this chapter I stated that our system of concepts should not include any EI variable that, on definitional grounds only, so closely resembled any other as to become superfluous. In this section I shall discuss whether or not there are any such relationships between the various pairs of EI variables.

Activity Transference and Internalization. Let us assume that in CC, RCs, and the relevant external components, the inputs into a particular activity are designated c, d and e. The activity transference of retail activities is then defined as $(c)/(c+d)$ and internalization as $(c+d)/(e+c+d)$.[3]

Assume some change in c and d leading to a change in activity transference; assuming no change in e, the degree of internalization may be affected or it may not. This is illustrated in table 6: 1, cases 1—3, for increases in activity transference. Decreases can be illustrated in a similar way. A change in the relation between e and $(d+c)$—i.e. primarily a change in the degree of internalization—may affect activity transference either way, or may not affect it at all. This is illustrated by cases 4—6 for increases in internalization. We can therefore conclude that a change in a particular direction in the degree of activity transference does not, by definition, lead to a change in any particular direction in the degree of internalization. Similarly a change primarily affect-

Table 6: 1 *Examples of Relations between Changes in Activity Transference and Internalization*

It is assumed that neither c, d nor e initially $=0$.

Change in the inputs into:	Case no: 1	2	3	Case no: 4	5[4]	6
CC's activity	+	+a	+a	+a	$+a_1$	0
RCs' activity	0	—a	—(a+1)	0	$+a_2$	+a
External activity	0	0	0	—a	—a	—a
Primary change in:						
activity transference	+	+	+			
internalization				+	+	+
Related change in:						
activity transference				+	0	—
internalization	+	0	—			

[3] For the sake of simplicity I have limited this part of the discussion to retail activities. A similar argument could he developed for wholesale activities.

[4] Conditions for case 5 must obviously be: $(c+a_1)/(c+a_1+d+a_2)=c/(c+d)$.

ing internalization does not necessarily lead to any specific change in activity transference.

Activity Transference and Exclusiveness. Activity transference is concerned with the internal allocation of resources for the execution of a particular activity, whereas external and internal flows are involved in the exclusiveness concept. Thus the concepts are expressed in different categories which makes it less likely that there will be any close a priori relation between them. However, such a relation will exist if CC's execution of retail activities, or RC's execution of wholesale activities, necessarily affects the relation between internal and external flows that are relevant from the point of view of exclusiveness, and vice versa.

Two examples:

1. CC takes over the subactivity *negotiations* in any of the activities concerning the acquisition of goods and production factors; this raises the degree of exclusiveness in the system's receival and transmission of (negotiation) information.
2. CC carries out completely certain activities such as *payment routine, acquisition of capital, establishing stores;* this is only possible in combination with complete exclusiveness in the relevant flows. On the other hand, complete exclusiveness in such cases does not require full activity transference.

For technical and economic reasons there may be little chance of CC executing retail activities concerned with certain external flows to or from RCs but this is not by definition impossible in our model. For example, it might be inefficient to involve CC in *goods receival* or *positioning/refilling* of goods delivered to RCs from external suppliers.

Activity Transference and Homogeneity. This relation has already been touched upon. Only if the part of the retail activity executed by CC cannot logically be allocated to the individual RCs, is there any relation by definition between activity transference and homogeneity. (E.g. supplier negotiations, transmission of advertising messages.) If CC carries out the whole subactivity in such a case, there will be complete homogeneity for the relevant activity dimension. However, complete activity transference is not a requirement for complete homogeneity.

Internalization and Exclusiveness. Internalization answers the question: how much of a particular activity is executed internally? Exclusiveness tells us how much of a certain type of flow is internal. At first glance, therefore, it seems likely that this pair of concepts will be closely related. A comparative analysis shows us that this is not the case.

a) Changes in the size of external flows do not necessarily lead to similar changes in the size of external activities. Assume an increase in the exclusiveness of the goods flow to RCs; the internalization of *price marking,* for example, may be affected either way, or may not be affected at all. It will increase, for example, if RCs' supplier always does the *price*

marking. It will decrease if CC's supplier takes over the activity from the RCs. It will remain the same if RCs do the marking, regardless of whether the goods are supplied by CC or by external suppliers, or if CC takes over the marking from RCs for the added internal goods flow.

b) Flows often arise from the execution of several activities. Internalization can vary for these at a given degree of exclusiveness.

c) Some external flows are not included in any definition of exclusiveness (e.g. flow of goods to CC). The internalization of activities affecting these flows cannot therefore be compared with any type of exclusiveness. Examples of such activities are the wholesale activities *in transport* and *goods receival*.

d) The parts of the wholesale activities that are concerned with flow relations to or from external customers have not been included in our definition of internalization (see p. 104). On the other hand, flows to and from these customers do form a part of several of our definitions of exclusiveness (e.g. the exclusiveness of goods flows from CC).

We can see from the above that there is no general a priori relation between internalization and exclusiveness; the concepts can fulfil independent functions in our system of concepts. However, if we assume a positive covariation between an activity's input and output, and define output as a flow quantity, then there will be a close connection between the two EI variables in some but not all cases. Given this assumption, for instance if the exclusiveness of the goods flow to RCs increases, the internalization of the wholesale activities related to the goods flows must also rise, unless RCs are carrying out wholesale activities.

Internalization and Homogeneity. No relations can be established between these concepts on definitional grounds alone.

An example: if an increase in the internalization of a retail activity has arisen because one CC has taken over execution from a number of external components, then this will not be accompanied a priori by an increase in homogeneity. If we assume that homogeneity is affected by the number of components involved in executing the activity, it follows that homogeneity will increase. On the other hand, if the increase in internalization has arisen because RCs have taken over the activity from the external components, and the number of RCs is greater, on the same assumption homogeneity will decrease.

Thus we have seen that a change in internalization does not, as a result of logical reasoning based only on the definitions of the two concepts, give rise to a change in homogeneity. Some other conditions must be fulfilled. The same is true if the primary change is in homogeneity: a consequent change in internalization cannot be assumed unless certain other conditions exist.

Exclusiveness and Homogeneity. No a priori relation exists here either. A change in homogeneity does not necessarily affect exclusiveness in any particu-

lar direction, and vice versa. Homogeneity in the activity *sales promotion*, for example, can increase without affecting the relation between the external and internal flows of goods or information. Suppose RCs' total external purchases drop, thus increasing the exclusiveness of the goods flow to RCs: The homogeneity of, for instance, *choice of suppliers*, in its dimension *identity of supplier*, may or may not be affected by this. Homogeneity probably increases if, for instance, suppliers to only a few of the RCs lose all their customers in the system. Homogeneity is unaffected if the flow quantity per external supplier decreases, but all the supplier/RC relations remain.

Conclusion. This analysis of the pairs of EI variables shows us that they are related to each other on purely definitional grounds in certain exceptional cases only, or if some further assumptions are made.

Operationalization of the EI Concepts and Description of Execution Integration in the Real Systems

Activity Transference

The problems of allocation to the CC and RC levels of the cost of a particular activity are here intrinsically important and complicated. Reference to the literature on cost analysis could suggest various ways of dealing with them. However, the scope of the present study is so extensive that the resources required for measuring and allocating costs component-wise and activity-wise would be greater than our purpose requires or our resources allow. I have therefore made estimates, based on interview material and in some cases on data from the questionnaires in appendix 4: 3. The following applies to activity transference for retail activities.

1) Every subactivity is given a "weight", (w_i) which shows its demand on inputs compared with other subactivities.
2) For every subactivity I estimate the proportion (c_i) of RCs for which there is any activity transference.
3) I then estimate the average extent (e_i) of transference in each subactivity, for those RCs showing transference according to (2) above.[5]
4) To find total *activity transference* I then multiply the three figures obtained for each subactivity (weight, component ratio, extent ratio) and add together the results. I then divide this sum by the sum of the weights of the subactivities. As a formula (A = activity transference):

$$A = \left(\sum_{i=1}^{n} w_i \cdot c_i \cdot e_i \right) / \sum_{i=1}^{n} w_i$$

5) The resulting figure, which will be between 0 and 1, is then used to rank

[5] The extent of the activity is defined in output terms in those cases where only CC or only RCs are involved in the execution of that part of the activity that refers to a

the activity transference of a particular activity in different systems, and to classify activity transference into one of five classes.

It is of course possible to rank activity transference without first calculating a total figure as in (4) above, if at least one of the numbers expressing "weight", "component ratio" or "extent ratio" is greater in one situation than the corresponding number in the other situation *and* if no such number in the latter is greater than in the former situation. Because of the way the empirical material was collected (mostly at interviews), the reliability of the measure obtained according to (4) above may be rather low. Consequently I have not presented this figure as my end result; instead I have let it provide a

Table 6: 2 *Ranking of Systems with Regard to Activity Transference in Certain Retail Activities.*

Several activities have been excluded from tables 6: 2 and 6: 3, some because by definition they can only be executed by RC, others because of insufficient empirical material.[6]

Acuvity	FII	PII-R	PII-W	NII
Choice nf suppliers	1	2.5	2.5	4
Ordering	2.5	2.5	2.5	2.5
Sales Promotion	1	2	3	4
Payment routine (purchase)	1	2	3	4
Payment routine (sales)	1	3	3	3
Price marking	1	3	3	3
Acquisition of capital	1	2.5	2.5	4
Acquisition of other personnel	1	2.5	2.5	4

specific portion of the total output. If, for instance, RCs and CC are both *prepacking* perishables, the extent to which this is done by CC is measnred as the portion of the total flow quantity of internally prepacked goods that have been packed by CC. If both CC and RCs take part in the activity relating to a specific portion of the total ontput, we have first to estimate CC's part of this in input terms. We can then proceed as above to calculate the extent to which the activity is carried out by CC. Assnme, for instance, tbat both RCs and CC take part in the subactivity *negotiations* with specific external snppliers, and that the output variable is defined as purchase quantity. If RCs and CC are responsible for equal quantities of inputs into these negotiations, and if purchases from these suppliers are half of RCs' total purchases from external suppliers, then the measure of the extent to which this subactivity has been transferred is 1/4.

Ontput terms have been used because the interview material contained more information on which to base estimates of outputs than estimates of inputs. At model level, the definition of activity transference was completely geared to *input* into the activity (p. 103). Snch a contradiction between the definition and its operationalization has negative effects on the validity of the measurements. However, if input and output covariate positivcly, then the consequences are less serious.

[6] These are *goods receival, prepackaging, positioning/refilling* and all activities but two in the activity group *acquisition and transformation of resources.*

Table 6: 3 *Classification of Activity Transference for Certain Retail Activities*[7]

Degree of activity transference	FII	PII-R, PII-W	NII
Complete	Acquisition of capital		
Very High	Payment routine (purchases) Choice of suppliers	Acquisition of capital	
Medium High	Ordering Sales promotion Acquisition of other personnel Price marking	Ordering	Ordering Acquisition of capital
Low	Payment routine (sales)	Choice of suppliers Sales promotion Payment routine (purchases) Price marking	Sales promotion Price marking
No or Very Low		Payment routine (sales) Acquisition of other personnel	Choice of suppliers Payment routine (purchases) Payment routine (sales) Acquisition of other personnel

basis for classifying the activity transference into five classes as follows (lower boundary in brackets): Complete (0.98), Very High (2/3), Medium High (1/3), Low (0.02), No or Very Low (0.0). The boundaries, except for the extreme classes, were arbitrarily chosen. An example of the ranking and classification of activity transference (*sales promotion*) is provided in schedule 6: 1. Rankings are reported in table 6: 2 and classifications in table 6: 3. The basis for the tables is provided in appendix 6: 1. Some retail activities always by definition have an activity transference of 0: *choice of assortment, pricing, service, checking out* and *storing*. For some other activities I did not get enough information to make any estimates. These are listed in footnote 6.

[7] See table 6: 2 for an account of why several activities are missing from this table.

Schedule 6: 1 *Estimating Activity Transference in Sales Promotion*

Subactivity	Output Variable	Weight of Subactivity (w_i)	Component ratio (c_i) Exceptions in brackets	Extent ratio (e_i) FII	PII	NII	$w_i c_i e_i$ FII	PII-R	PII-W	NII
A. Supplier negotiations	Inflow of SP goods (in monetary value)	1	1 (NII, 1/2)	close to 1	3/4	1/2	close to 1	3/4	3/4	1/4
B. Ordering goods	»	1	0 (FII, 1)	» 0	—	—	» 0	0	0	0
C. Transmitting advertising information	No. of advertising messages	FII, PII-R, 3. PII-W, 2. NII, 1.	1 (NII, 1/2)	» 1	3/4	3/4	» 3	9/4	6/4	3/8
D. Manufacturing display material	No. of display signs	1	1 (NII, 1/2)	» 1	3/4	1/4	» 1	3/4	3/4	1/8
E. Display	Outflow of SP goods (in monetary value)	2	0 or close to 0	» 0	close to 0	0	» 0	close to 0	close to 0	0
F. Sales conversations with consumers, Demonstrations of goods	»	3	0 (FII, 1/4)	1/4	—	—	3/16	0	0	0
G. Pricing	»	0	0	—	—	—	0	0	0	0
H. Price marking	»	2	1 (NII, 1/2)	1/10	1/20(-R) 1/15(-W)	1/20	1/5	1/10	2/15	1/20

Comments:

Weight of the subactivity

C. (The letter indicates the subactivity.) Only internal execution is included. The different weights arise because FII/PII-R have some internal media for mass communications and NII has very little production of material for "direct advertising".

G. By definition execution means that goods can be purchased at the price chosen in the decision process. Input into this activity is assumed to be negligible. Thus pricing is weighted 0.

Component ratio

A, C, D, H. About half the RCs in NII take part in the centrally planned SP program.

B. CC assigns some SP goods to RC without RC having ordered them in FII.

F. CC personnel demonstrate goods in large stores in FII.

Extent ratio

A. In PII, and even more in NII, RC has direct contact with suppliers regarding individual SP activities. FII has practically no contacts of this kind.

B. FII has very few "assigned" SP goods.

C. PII and NII have more individual "direct advertising" by RC than FII.

D. There are hardly any RC-manufactured display signs in FII; in NII there are very few CC-manufactured signs. In PII, RC-manufactured signs represent a good proportion of the signs concerned with RC's individual SP-activities Note that display materials by external manufacturers are not included.

H. In the main CC marks perishable foods only. The proportions given here are very uncertain, but the figures are so low in all systems, that the total effect on the allocation of work cannot be very great. Differences that do exist depend on the different degrees of exclusiveness in the flow of goods to RCs (perishables).

Result

Activity transference in the different systems is: 0.41, 0.30, 0.26 and 0.07. This gives us the ranking: 1. FII 2. PII-R 3. PII-W 4. NII. This gives us the classification: FII Medium High, PII-R, PII-W and NII all Low.

Internalization

Measurements of internalization also involves activities carried out by external components. Since I could not extend the empirical study to include components outside the systems, no measurements have been made of this variable.

Exclusiveness

Goods Flows

Goods flows from CC have been measured according to the invoiced net sales of goods physically distributed through the component concerned. The total flow of goods to RCs has been calculated by subtracting sales tax and FII's average retail margin from total sales. Since the other systems found it difficult to supply the relevant information, I applied the FII margin in all systems.[8]

In FII the data required for calculating the goods flow to RCs forms part of CC_{11}'s accounting records. In the other systems, CC's information about RC's sales is in most cases based on figures supplied by RC. In these systems, therefore, the measurement of goods flows to RCs is probably less reliable than of goods flows from CC. Table 6:4 shows exclusiveness, revealed by the measurement of goods flows.

Table 6:4 *Exclusiveness of Goods Flows, 1965*

Type of exclusiveness	FII	PII-R	PII-W	NII
Exclusiveness of goods flows from CC[9]				
Incl. receivers in the *large system*	0.99	0.98	0.43	0.58
Excl. receivers in the *large system*	0.22	0.93	0.43	0.54
Exclusiveness of goods flows to RCs[10]	0.69	0.44	0.41	0.27

Payments Flows

Payments Flows for Goods. A central component may carry out the wholesale activity *payment routine* (*sales*) for certain goods which it does not itself

[8] Investigations by the National Swedish Price and Cartel Office of retail margins in the food trade confirm that this is sufficiently accurate for my present purpose. (*Pris- & Kartellfrågor* no. 4—5, 1963, table 66.)

[9] Only CC at the lowest level in the PII- and NII systems distributes goods to receivers on the RC level. In FII only goods flows from CC_{12} are included, since CC_{11} does not distribute goods to RCs and CC_{13} does so only to a relatively small extent, for foods. For definition of *large system* see p. 50. The great difference between the figures including and excluding receivers in the *large system* is due to the fact that CC_{12} distributes over a large area, in which the RCs of FII represent only a minor part.

[10] CCs at a higher level than those mentioned in footnote 9 are included here in accordance with the delineation of the systems given on page 51. However, this has only affected FII (from 0.58 to 0.69) since the higher level CCs in the other systems do not distribute goods to RCs.

distribute (direct deliveries). Moreover a central component may carry out the retail activity *payment routine* (*purchases*) for certain external goods flows to the retailers (e.g. as part of a cooperative agreement with an external supplier). Thus the exclusiveness of the payments flows for goods need not necessarily be the same as the exclusiveness of the goods flows themselves. The measurements are presented in table 6: 5. The various degrees of exclusiveness in the table are close to the corresponding figures in table 6: 4, except for the flows from RCs in FII and PII-R.

Table 6: 5 *Exclusiveness of Payments Flows for Goods, 1965*

Type of exclusiveness	FII	PII-R	PII-W	NII
Exclusiveness of payments flows to CC[11]	0.99	0.99	0.42	0.59
Exclusiveness of payments flows from RCs[12]	1.0	0.63	0.42	0.29

Payments Flows for Investments. Here our measurements concern the financing of new retail units. Loans, of which no central component is either lender or guarantor, have been counted as flows from *external* sources. The flow from RCs is defined as the total cost for executing the *establishing* activity, as revealed in the system's accounting records or special calculations. (See questionnaire, appendix 4: 3.)

Table 6: 6 shows that exclusiveness is highest in FII and approximately the same for the two PII systems. In NII no new units have been established in

Table 6: 6 *Exclusiveness of Payments Flows for Establishment of New Retail Units*[13]

	FII	PII-R	PII-W	NII
Total cost, millions of crowns	9.5	8.7	1.63	0.90
Of which, external flow received by RCs, millions of crowns	0	2.4	0.35	0.55
Exclusiveness of payments flows	1.0	0.72	0.79	0.39

[11] Senders include RCs in the *large systems*. Same CCs as in table 6: 4 regarding goods flows from CC.

[12] Measures are the same regardless of whether receivers in the *large systems* are included or not.

[13] Periods covered are:

FII: From 1.7.63 to 30.6.65. Establishment costs for non-food departments in department stores included.

PII-R: 1965. All establishments in CC_{12}'s area of operations included.

PII-W: 1965.

NII: 1964 and 1965. Figures refer to rebuilding operations.

recent years. To provide some sort of comparison, albeit a somewhat misleading one, the financing of store rebuilding has been included instead.

Payments Flows for Profits (Losses) in RCs. The ranking has been based on interviewees' answers to the question: who has the right of disposal of the profits or covers the losses? In profit is included: owner withdrawals apart from normal manager's salary; employee remuneration, proportionate to results; any bonus withheld by CC for a particular period. The exclusiveness of this payments flow is ranked: 1. FII, 2. PII-R, 3. PII-W, NII.

FII: RC's profit or loss is totally absorbed into CC_{11}'s result, except for a relatively small bonus paid direct to RC employees. The dividend paid to the consumers/owners is paid by CC.

PII-R: RC's profit is wholly at the disposal of the store owner; it *can* be used for external payments as RC chooses, except that: 15 % goes to CC_{22}, where CC and the store owner each own 50 % of the shares; annual bonus (a considerable portion of the profit) must remain in CC_{22} for five years; losses are in some cases covered by CC through extension of credit or credit loss. In the few cases where CC_{22} is single owner of RC, the FII description applies.

PII-W, NII: Here there is no annual bonus and no "50-50 arrangement". Otherwise the same as PII-R.

Production Factors Flows

Store premises is the only production factor that has been included in the measurements. The *stores new to the system* during a certain period have been divided into two classes: (1) where CC originally obtained the right to the site, and (2) where, during the period concerned, an external RC qualified as an internal component by fulfilling the relevant criteria for internal components, or where the store owner or an external agency originally obtained the right of disposition to the store site.

Table 6: 7 *Exclusiveness of the Flows of Store Premises*

Period covered: 1964—1965

Type of flow	FII	PII-R	PII-W
All incoming store premises	6	7	12
Obtained through CC	6	6	6
Exclusiveness of flow into the system	1.0	0.9	0.5
All outgoing store premises	31	36	13
Right of disposition not passed on to any competitor	31[14]	36	9
Exclusiveness of flow from the system	1.0	1.0	0.7

[14] Competitors received right of disposition in 7 cases but as Full DI for the activity applies these are not counted as external flows (p. 107).

The *stores which ceased* to carry out internal activities during the period have also been divided into two classes: those where the sale of food ceased with the close-down and those where external food retailing activities began immediately, or very soon after, the close-down. For measurements, see table 6: 7. NII has not been included as no new units were established in the system during the period concerned.

Information Flows
The exclusiveness of the information flows has not been measured.

Homogeneity

Homogeneity has been measured for a few activity dimensions only. Results appear in schedule 6: 2. Element definitions are given in appendix 5: 1. Three methods have been used:

a) Description of the activity dimension concerned for each component by the use of questionnaires. This measure is, from the point of view of validity and reliability, better than (b) and (c) below. Unfortunately the descriptions required are in most cases costly to obtain. I have therefore used this method only for some easily observable dimensions (*width of assortment, identity of supplier, type of service system*).
b) In some cases, interviewees' descriptions of the execution of activities could be used as a basis for ranking. The homogeneity of a particular activity dimension in system A is higher than in system B if, according to the interviewee's description of the activity, fewer action alternatives occur in A. (The validity of this measure suffers from the fact that the dispersion of the components among the alternatives has not been included.)
c) The descriptions on which the measurement of decision integration was based can also be used to rank homogeneity as follows: homogeneity is greater in system A than in system B if, according to the control information, the intention is (for a particular activity dimension) to achieve greater homogeneity in A than in B *and* if decision integration is greater in A.

The homogeneity of the dimension *identity of supplier* in *choice of suppliers* appears in table 6: 8, page 126. The data was collected in a special enquiry, which is described in greater detail in appendix 6: 2.

Correlation Between Rankings of EI Variables

Even a superficial consideration of these rankings leaves us with a clear impression of agreement between them. I have tried to study this correlation more closely in two respects. First, I have estimated the correlation between the rankings of each EI variable. Secondly, I have estimated for each activity the correlation between the rankings of the different EI variables. The results of these calculations are presented in tables 6: 9 and 6: 10.

Schedule 6: 2 *Ranking of Homogeneity for Certain Activity Dimensions in Some of the Retail Activities in the Systems*

Activity and dimension	Ranking	Comments
Choice of assortment		
Identity of article	1. FII The other systems have not been ranked among themselves.	FII has the highest DI; control information aims at higher homogeneity than in the other systems (c).[15]
Width of assortment	All ranked equal	In all the systems all RCs carry all groups of merchandise (dairy, bakery, meat, vegetable, grocery + other products). Thus in all the systems homogeneity is 1 (a).
Choice of suppliers		
Identity of supplier	1. FII 2. PII-R 3. NII 4. PII-W	See separate report in table 6: 8 (a).
Ordering		
Technique, transferring information	1. FII 2. PII-R 3. PII-W 4. NII	Main weekly orders are sent only on preprinted order forms in all systems with the exception of NII where ordering by telephone also occurs. Corrections and additions to the main order are given by telephone on RC's initiative only in FII. In the nther systems CC nearly always takes the initiative by calling RC but often initiative is taken by RC as well when correcting a certain main order. Extra orders are transferred by telephone on RC's initiative in all systems. In PII-W and NII a number of RCs also order at visits to the cash- and- carry warehouse. Thus the number of separate action alternatives is greatest in NII followed by PII-W, PII-R and FII (b).
Pricing		
Price per article	1. FII	For all the systems there are lists of suggested prices and deviations from these lists. In FII the lists cover a greater proportion of the total assortment (only perishables with unstable prices are exempt) than in the other systems. DI is clearly highest in FII and aims at the greatest homogeneity (c).

[15] The letter in brackets after each comment indicates which of the above methods (a—c) has been used.

Schedule 6: 2 (cont.)

Activity and dimension	Ranking	Comments
Sales Promotion		
Display	1. FII 2. PII-R 3. PII-W, NII	The "sales points program" in FII aims at greater homogeneity in the display of the various SP items than does the control information in PII-R (mainly the "sales ideas leaflets"). DI is highest in FII. PII-W and NII are classified as having Very low or no DI in this dimension (c).
Service		
Type of service system	1. FII 2. PII-W 3. PII-R 4. NII	Stores are classified as either self-service stores or manually operated stores. Ranking is based on the number of stores using the system's most frequent type of service system (a).
Goods receival		
Technique (used at deliveries of the weekly main orders from CC)	1. FII, PII-W, NII 4. PII-R	In FII, and PII-W/NII, one technique is used in all RCs, i.e. "floor carts" and "parcelwise handling", respectively. In PII-R both these techniques are used and "containers" as well. (b)
Price marking		
Technique	1. FII	FII aims at greater homogeneity than other systems since control information contains advice, based on time studies, about techniques for the various product groups. DI greatest in FII. (c)
Positioning/ refilling		
Technique, refilling	1. FII	Same as *price marking*. (c)
Acquisition of other personnel		
Terms of employment	1. FII	FII is associated with the employer's organizatioo within CC_{19}. Conditions of employment are regulated hy collective agreement. CC's aim is higb homogeneity within the various personnel categories. Fnll DI. (c)

In my calculations I have included only those rankings that cover all four systems. This holds also for the calculations in tables 6: 11 and 6: 12 below.

It has to be remembered that as the number of rankings and the number of elements in them are small, *the probability is rather high for the occurrence of*

even highly correlated rankings. Furthermore, when interpreting the results it is not possible to generalize about the relations between the various variables in the studied systems, because the observations have not been preselected in the requisite manner.

Table 6: 8 *Homogeneity of Choice of Suppliers, Dimension Identity of Supplier*[16]

Group of merchandise	FII	PII-R	PII-W	NII
Dairy products	0.54	0.70	0.56	0.63
Bakery products	0.86	0.34	0.14	0.00
Meats (incl. cold meats)	0.75	0.39	0.33	0.00
Fresh fish	0.00	0.00	0.00	0.00
Vegetables, fruit	0.63	0.58	0.37	0.52
Groceries etc.	0.31	0.42	0.17	0.35
Total (food)	0.46	0.39	0.16	0.20

Table 6: 9 *Correlation Between Rankings of EI Variables*

Kendall's coefficient of concordance (w), corrected for ties. Asterisk indicates values that are significiant on the .01 level (Siegel, 1956, pp. 229 ff. and 286).

EI Variable	Coefficient of concordance (w)	No. of rankings	Rankings acc. to
Activity transference	0.61*	8	Table 6: 2
Exclusiveness	0.79*	6	Tables 6: 4—6: 7 and p. 122
Homogeneity	0.36	6	Schedule 6: 2

Some tentative explanations of the correlation between the rankings as shown in table 6: 9 are:

a) The different rankings may all be affected by another variable which is correlated with the EI variable included in the calculation. *Institutional*

[16] See appendix 6: 2 for a description of how the data was collected and how homogeneity was calculated; also a detailed account of the number of suppliers to the various systems in the different groups of merchandise, and the average number of suppliers to small and large stores. Homogeneity has been calculated according to the method explained on p. 111, k/m somewhat arbitrarily fixed at 3/4. Two reasons for not choosing k close to m are: (a) few suppliers are common to almost all RCs; then the homogeneity measure would be so close to 0 as to fail to discrimioate between the systems, (b) the measure would he very sensitive to iodividual RC's reporting errors.

Table 6: 10 *Correlation Between Rankings of EI Variables for the Same Activity*

Kendall's coefficient of concordance (w) and Spearman's rank correlation coefficient (r_s), both corrected for ties. (Siegel, 1956, pp. 202 ff. and 229 ff.) For sources of rankings, see table 6: 9.

Activity[17]	Exclusiveness concerns:	Calculation concerns rankings of:[18]	Correlation coefficient[19]
Choice of suppliers	Goods flow to RCs[20]	A, E, H	0.84 (w)
Ordering	»	A, E, H	0.50 (w)
Sales promotion	»	A, E, H	0.96 (w)
Payment routine (purchases)	Payment flows for goods from RCs	A, E	+1.0 (r_s)
Payment routine (sales)	Payment flows for profits (and losses)	A, E	+0.82 (r_s)
Goods receival	Goods flows to RCs	E, H	−0.26 (r_s)
Price marking	»	A, E	+0.77 (r_s)
Acquisition of capital	Payment flows for investments	A, E	+0.95 (r_s)

integration and decision integration seem likely candidates for such variables. Correlations between these variables on the one hand and execution integration on the other, in our empirical material, are reported and discussed in the following sections.

b) The interdependency between activities may be of such a nature that, for reasons of efficiency, an EI variable is either high or low for the interdependent activities and not high for some and low for some. How the efficiency of a change in the value of a particular EI variable in activity A can be affected by the value of the same variable in activity B will be discussed in chapter 9.

c) Some activities or flows can, by definition or as a result of behavior in the studied systems, be so close to one another that the values of the EI variables are affected. We cannot say, for instance, that the flow quantities of goods, payments for goods, and order information will by definition be

[17] The coefficient cannot be calculated for one of the cases in schedule 6: 2, since all ranks are equal and r_s is not defined in such cases.

[18] A = Activity transference
E = Exclusiveness
H = Homogeneity

[19] The approx. probability of an r_s value as high as 1.0 is 0.04, as high as 0.8 is 0.17 and as high as 0.6 is 0.20 (Olds, 1938, table IV).

[20] Including deliveries from suppliers in the *large system*.

very highly correlated, but it seems reasonable to suppose that in real systems they probably are. Furthermore, activities may overlap, with a subactivity of A also being part of B (see appendix 2: 1 for examples of this).

According to table 6: 10, the rankings of the different EI variables for the same activity are also in most cases highly correlated. Explanations of this phenomenon can be sought along the same lines as above.

Explanations according to (a) are discussed below.

In explanations of type (b) above I assumed the existence of some relation between EI variables and efficiency. This is further discussed in chapter 9. Let us here only look at an example. Assume that we wish to improve the efficiency of our *sales promotion* by increasing CC's part in its execution. If we are really to achieve greater efficiency, there may also have to be a high degree of *homogeneity* in the various activity dimensions, because individual deviations might prevent our enjoying the advantages of scale (e.g. in negotiations, advertising, etc.) that would otherwise accrue as a result of the greater *activity transference*. The system's *exclusiveness* with regard to the goods flows to RCs will also affect the issue: if it is low, a sufficient bargaining strength vis à vis external suppliers in the subactivity *supplier negotiations* might be difficult to achieve.

With regard to explanation (c) the a priori relations between the EI concepts were discussed earlier in this chapter. We concluded that such relations did not occur other than in exceptional cases. In operationalizing the concept of activity transference, the total extent of the activity has been defined in terms of output rather than input. This does not mean, however, that any a priori relation has been established between activity transference and exclusiveness, apart from that already indicated on p. 114.

Relationships Between Execution Integration and Other Integration Variables

Relationships Between Institutional Integration and Execution Integration Based on the Definitions

The institutional relations that define institutional integration may involve mandatory rules about which components are authorized to carry out which activities. For some of the flows of information, payments and production factors, such rules guarantee a high degree of exclusiveness; for some activities or subactivities they ensure a high degree of activity transference. This applies to some of those activities and related flows which will involve a component in a legally binding agreement with external components, or determine the way a component shall dispose of production factors or means of payment. Rules of this type are included in the institutional relations that define Full

Table 6: 11 *Rank Correlation between Institutional Integration and the Various EI Variables for Individual Activities or Flows Studied*[21]

Spearman's correlation coefficient, (r_s). Corrected for ties.

Value of correlation coefficient, r_s[22]	No of comparisons between II and: Activity transference	Exclusiveness	Homogeneity
+1.0	3		
+0.99—0.90	2	4	3
+0.89—0.70	2		
+0.69—0.50		2	1
under +0.50			1 (—0.13)

Institutional Integration. Some of them *may* also be part of relations defining Partial Institutional Integration (e.g. rules about the transfer of leasing agreements for store premises). Thus, in certain cases, institutional relations can be a sufficient condition for high values of EI variables. On the other hand, low institutional integration does not by definition exclude the possibility of high EI.

Institutional relations can consist of rules which, *if followed,* will lead to high values for some EI variables. For example, the charter of a PII system may (a) stipulate a certain exclusiveness of goods flows, i.e. concentration of retailers' purchases to the system's wholesale units, (b) a certain homogeneity, e.g. follow-up of the common SP-program, or requirement regarding RC's width of assortment, or (c) contain rules about activity transference, e.g. CC to negotiate about new store premises. However, as the institutional relations as such do not guarantee that the rules will be followed, there will not a priori be any relations between institutional integration and execution integration.

Correlation Between Rankings of Institutional Integration and Execution Integration

The rankings reported above for the EI variables are highly correlated with the rankings of institutional integration. This can be seen from table 6: 11.

Some tentative explanations of the generally high correlation are as follows:[23]

a) The relation discussed above between execution integration and the rules

[21] For sources of rankings on which the coefficients are based, see table 6: 9. For the II-variable see p. 48. One ranking from table 6: 2 and one from schedule 6: 2 have been omitted, since all systems rank equal.

[22] The probability of chance occurrence of some r_s values is given in footnote to table 6: 10.

[23] Admittedly, the probability that the correlation has occurred by chance is not negligible since each separate ranking contains only a few observations.

contained in institutional relations can either *ensure* or *favor* high values for EI variables when institutional integration is high. It can, for example, guarantee a high degree of activity transference for most negotiating activities in FII; in the PII systems it can favor a relatively high degree of homogeneity in *sales promotion.*

b) It is possible, particularly in PII systems, that the rules contained in the institutional relations may have originated as a description of a system's behavior, although the existence of the relations have not in themselves affected the behavior.

   An example: An NII system attains PII status only when the exclusiveness of the goods flows and the homogeneity of the *choice of assortment* have become so high that a voluntary chain program containing common SP programmes, consultant operations, etc. becomes practicable. The institutional relations contain rules for RC's purchasing and assortment policy; these reflect the system's attributes with regard to the exclusiveness of goods flows and homogeneity in *choice of assortment;* they do not affect the components' behavior.

c) The correlation between II and EI can be explained by a *relationship between, on the one hand, II and DI and, on the other, DI and EI.* The first of these has already been discussed on pp. 99 ff. The latter will be discussed below.

d) In three of the systems, *criteria for delimiting the system* consist of attributes of the institutional relations between components. If we choose some other criterion for delimitation (assuming unchanged institutional relations), then we will probably see certain changes in the composition of the components in the system, with possible changes in the values of the EI variables as a result. In what way this would affect the correlation between II and EI variables cannot, however, be generally specified.

   An example: Since institutional relations have been used for delimiting the system, PII-W does not include retail components that are not members of the voluntary chain, even if CC_{81} is their main supplier. This affects, for instance, the exclusiveness of the goods flows from CC, which is low in comparison with the PII-R system. If the system had instead been defined according to the criterion used for NII (see p. 50), then this EI variable would probably have had much the same value in PII-W as in PII-R.

Relationships Between Decision Integration and Execution Integration Based on the Definitions

Only in special cases is it possible to deduce a relation between the degree of execution integration and decision integration on purely definitional grounds. See, for instance, the example in figure 5: 6 p. 72, which shows that a high degree of DI is compatible with both a high and a low degree of homogeneity.

In the case of activity transference, however, CC by definition completely controls that part of the retail activity that it carries out. Thus complete activity transference implies Full DI (see p. 71). In the operationalization of DI, full or very high activity transference must apply in cases of Full DI. Activity transference also affects the DI-factors "execution" and "review information".

In those cases where a relation exists, by definition, between activity transference and other EI variables (as has been discussed on pp. 113 ff.), DI and those EI variables are indirectly related via the activity transference.

Correlation Between Rankings of Decision Integration and Execution Integration

The rank correlation between decision integration and the various types of execution integration have been calculated for the cases where a complete ranking of the EI variables has been recorded above. The distribution of the coefficients within different intervals are presented in table 6: 12 below.

Table 6: 12 *Rank Correlation Between Decision Integration and the Various EI Variables for Individual Activities or Flows Studied*

Spearman's rank correlation coefficient, r_s. Corrected for ties.[24]

Value of the correlation coefficient, r_s[25]	No. of comparisons between DI and: Activity transference	Exclusiveness[26]	Homogeneity
+1.0	3	6	1
+0.99—0.90	1	4	2
+0.89—0.70	2	1	
+0.69—0.50		1	1
under +0,50	1 (+0.40)	1 (+0.40)	1 (—0.26)

As we have just seen, the relations between EI and DI variables can be explained in some cases by reference to definitions; for other cases I suggest one or more of the following tentative explanations of the correlation between decision and execution integration.

[24] The rankings on which the calculations are based are reported in table 5: 1 and the source references in table 6: 9. One activity from table 6: 2 and one from schedule 6: 2 have been excluded because all the ranks were equal and r_s thus indeterminate.

[25] The probability of a chance occurrence of some r_s values is given in footnote to table 6: 10.

[26] *Service* and *checking out* have been excluded since no relevant exclusiveness measure exists in the material. The ranking of the *exclusiveness of goods flows to RCs* is compared with the ranking for a retail activity with the exception of *payment routine (purchases)*, *payment routine (sales)*, and *acquisition of capital* where the corresponding flows are *payments for goods from RCs, payments for profits (losses) in RCs* and *payments for establishing new retail units.*

a) The idea of establishing high decision integration in certain activities may in fact be to reach or maintain high values in one or more EI variables. See appendices 5:3, 8:1 and 9:1, for some examples of this. These appendices also indicate that control information probably only rarely aims at decreasing EI or maintaining *low* EI values.

b) The degree of decision integration may affect the *efficiency of the decision processes* of the system. (This is analysed in chapter 8.) It is then possible that high DI values result in higher efficiency if the values of certain EI variables are high rather than low.

An example: We assume that DI is high for *pricing;* the cost for transmitting control and review information between CC and RC will be higher if prices vary greatly between stores than if they are very uniform.

Another example: Increased exclusiveness in the payments flows from RCs can result in lower costs or higher quality of review information about RCs' *choice of assortment, choice of suppliers, ordering,* etc. This will increase the efficiency of the decision process, given a high degree of DI in these activities.

We can also combine explanations of types (*a*) and (*b*) to describe a sometimes quite complex chain of events covering several periods.

An example: Initially (period 1) we assume that *DI* has increased in *choice of assortment* with the aim of achieving greater *homogeneity* in this activity. This *EI* variable thereby has a higher value in period 2, which may make it possible in period 3 to increase *DI* in *sales promotion,* since the cost of transmitting control information to RC will be lower if the SP articles are included in RC's regular assortment and since SP-articles common to almost all RCs are easier to find if the assortments are more homogeneous. By period 4 the increased *DI* in the *sales promotion* activity may have led to an increase in the *exclusiveness* of the information flow for supplier negotiations. In period 5 the increase in this EI variable may have opened the way to greater *DI* in the activity *choice of suppliers.* If we examine the degree of *DI* and *EI* in period 6 in one system that has gone through this development, and in another that was similar at the beginning of period 1 but has undergone no changes, we will find a positive correlation between *DI* and *EI.*

c) Finally, it may be possible to explain a correlation between decision integration and a certain EI variable by the fact that another EI variable is related to both DI and the first EI variable. For example, if DI is increased in order to increase *exclusiveness,* the increase in DI may be associated with an increase in *internalization,* since exclusiveness and internalization may be associated.

Chapter 7
Analyses in Marketing Literature of Relations Between Integration and Efficiency

Descriptions and analyses of relationships between integration and efficiency in the wholesale and retail trades appear in marketing textbooks and in general studies of structure and trends in the distributive trades. There have also been a few studies devoted specifically to the subject. The topic crops up fairly frequently, too, in professional and trade journals etc.[1]

In this chapter the reader will find a summary of various analyses from marketing literature. I have restricted myself here to literature on marketing systems embracing wholesale and retail activities. This does not mean that I find other types of literature irrelevant to the problem area. On the contrary, as will be shown in chapters 8 and 9, the subject is of an inherently multi-disciplinary nature.

My purposes in reviewing the literature in this chapter are three. First, the analyses will serve in part to motivate the choice of variables and relations in my subsequent analysis (chapters 8 and 9).

Secondly, the review of literature and methodological aspects of it will serve as a general background for evaluating the need for research and the contributions made by this and other future studies. Thirdly, the summary of the analysis found in the literature should be of some interest in itself.

My presentation falls into three main sections. First I shall review the literature in a general way. Secondly, I shall present a series of schedules summarizing various relations, as about twenty writers have expressed them. Finally I shall discuss the literature from a methodological point of view.

[1] Examples of textbooks with relevant sections: Duddy & Revzan (1953), Henell (1966), Howard (1963), af Trolle (1963), Vaile, Grether & Cox (1952).

Examples of general studies of structural developments in the distributive trades: Disch (1963), Fulop (1964), Fog & Rasmussen (1965), Hall, Knapp & Winsten (1961), Jeffereys (1954), Stacey & Wilson (1965), SOU (1968).

Examples of special studies: Adams (1962), Alers (1953), Elkins (1962), Fnlop (1962), Mueller & Garoian (1961), Organization and Competition in Food Retailing (1966), Samverkan för framtiden (1967).

Examples of articles: McCammon (1965), Grossenbacher (1963), Heflebower (1957), Hanseu (1965), Henell (1967), Mattsson (1961 and 1962).

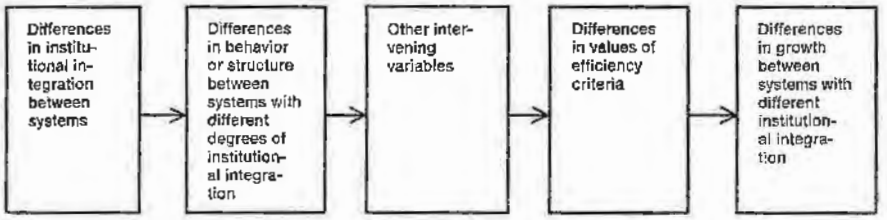
General Review of the Literature

Figure 7: 1 illustrates a typical analysis found in the literature: what I shall call a typical "argument". It concerns a comparison between systems with different degrees of institutional integration. First it often indicates any differences between the systems with regard to component behavior or structure, and then concludes with a statement about differences in efficiency. These latter are then often cited in explanation of differences in the growth of the systems on the market. The relation between behavior or structure and efficiency is often traced through various intervening variables. Sometimes the analysis also contains some indication of the way in which environmental factors can affect one or more stages in the "chain of reasoning" of which the argument consists.

Number of Stages from the Typical Argument Included in a Study

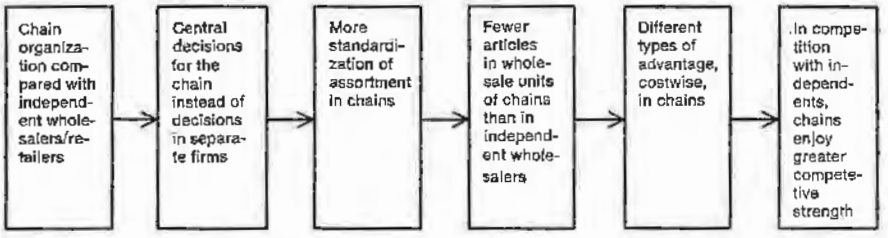
Most writers have some of the following aims in view: to describe, explain, predict or evaluate the structure of the distributive trades with regard to the market shares or the behavior of systems with different degrees of institutional integration. Studies may be concerned with some or all stages of the typical argument.

Figure 7: 1 *Typical Argument in an Analysis of Relations Between Integration and Efficiency*



An example

(Part of the analysis in af Trolle, 1963, pp. 155—157.)



One type of study describes the growth, efficiency, behavior or structure of systems with different degrees of institutional integration but does not discuss any reasons for the relations between these variables. Examples are: official

censuses of business, devoted purely to the description of structure; studies of the ways in which chain organizations, voluntary chains etc. develop, or differ from each other, as regards organization, marketing policy, store structure, etc.[2] In some studies the comparison between systems is never more than implicit. For example, an author may describe different methods of cooperation in voluntary chains; it is then implied that such measures do not occur in systems lacking such institutional relations although this is not stated.

Another type of study discusses reasons for assumed or empirically observed relations between institutional integration or behavior/structure on the one hand and efficiency/growth on the other. An example: the lower purchase prices in an FII as compared with an NII system might be explained in one of the following ways: "FII buys more per supplier" or "FII's assortment is more standardized" or "FII's assortment is more standardized and FII therefore buys more per supplier". Sometimes the value of some environmental factor is included to explain the relation between quantity and purchase price. The analysis can also be expanded to explain why differences in institutional integration lead to different degrees of standardization, why higher standardization results in larger purchase quantities, and why lower purchase prices lead to higher relative growth. Obviously analyses can—and do—vary very much in the amount of detail with which the analysis is carried out in the different stages of the typical argument.

Very often one of the variables which could be incorporated in a more thorough analysis is regarded by the author as a sort of "influencing" factor, appearing in lists headed variously as "Advantages and disadvantages of integration", "Reasons for the growth of different types of integration" etc. (See, e.g. Cole, 1952, p. 11; Fog & Rasmussen, 1965, pp. 519 f.)

In an analysis such as the example above, a relation between institutional integration and relative growth might be explained by such factors as "lower purchase prices" or "greater purchase quantities", etc. Changes in environmental variables are also sometimes suggested as such factors, e.g. greater price differences between small and large purchase quantities.

In many cases the variables describing differences in behavior or structure between systems with different degrees of institutional integration, correspond closely to our concepts of decision integration or execution integration. In schedule 7: 1—7: 6 below many examples of this type are given.

Another type of study is devoted chiefly to evaluating, from the point of view of social efficiency, particular aspects of the development of institutionally integrated systems. Such studies are primarily concerned with the integration/efficiency relation from the point of view of society. Examples: Mueller & Garoian (1961), Organization and Competition in Food Retailing, (1966).

[2] Examples of the second type of study are: Disch (1963) and Hintze (1963) where "structure and development" in German and French domestic trade is described.

Number of Arguments in an Analysis

The number of arguments used in the analysis varies from author to autbor. Galbraith's theory of countervailing power (Galbraith, 1956) can exemplify an analysis with very few arguments. Galbraith explains the emergence of large scale distributors (chains, buying groups etc.) on the grounds that they can act as a counterweight to the monopolistic power of the large producers. Jeffereys (1954), on the other hand, introduces a great many arguments into his analysis of the causes of the expansion of chains in Great Britain during the first half of the 20th century.

Often the analysis may take the shape of a list—simple or elaborate as the case may be—of the "advantages" and "disadvantages" of this or that type of institutional integration.[3]

The various factors or arguments sometimes complement and sometimes contradict each other in explanations of a particular phenomenon. Au example of complementary arguments: the lower wholesale costs of the chains depend *partly* on reduced transport costs resulting from regular deliveries and *partly* on reduced storage costs resulting from the smaller assortments. An example of conflicting arguments: in an FII system the specialization of the decision process leads to greater efficiency in sales promotion; in an FII system decision centralization reduces the possibility of local adjustments to competition and demand. (Both examples from Fulop, 1964.)

Connection Between the Studies and Observations of Real Systems

The purely structural descriptions mentioned above clearly exemplify studies of real systems. In most studies, however, it *is often difficult to tell whether the discussion is about real systems or models,* i.e. whether it refers to the description level or to the model level (p. 3).

A typical illustration of this difficulty is the list of possible advantages and disadvantages in Cole (1952). The author says that the list is based partly on discussions with businessmen and government officials and partly on published material on the subject. Both these sources may contain iuformation referring to models, to real systems or to both. When the author analyses his material, probably adding his own ideas and his variously systematized observations, it is very difficult to tell what level we are supposed to be on. Some of Cole's "advantages" have close equivalents among the "disadvantages", e.g. "prompt revision of production and distribution policies" and "inflexibility of operations". This contradiction may have arisen because the

[3] For instance Cole (1952, pp. 11 ff.) lists 16 possible advantages and 10 disadvantages of vertical integration (in production as well as marketing), Fog & Rasmussen (1965, pp. 519 ff.) lists 9 advantages for chain stores, 5 advantages for independents and 6 factors that can be used to explain differences between the total market share of the chain stores in different trades.

statements refer to different real systems, or to different models, or to a mixture of real and model systems.

Links with Theory in Economics and Behavioral Sciences

When it comes to choosing variables or indicating relationships between them, there is rarely any explicit reference in the literature to the models and methods of economics and the behavioral sciences. The following are some examples of exceptions.

Heflebower (1959) and Munthe (1967) discuss various approaches, based on the economic theories of competition and production, to the explanation of the growth of large-scale distributors (e.g. the "theory of countervailing power" launched by Galbraith, 1956). Hall, Knapp & Winsten (1961) turn to economic theory to motivate their choice of variables in a comparative study of productivity and the structure of marketing firms (among other things, the existence of chains) in different regions in the USA, Great Britain and Canada. Mueller & Garoian (1961) are methodologically influenced by the literature of industrial organization (as developed in Bain, 1959) in their study of structure, behavior and performance in grocery retailing in the USA. Balderston (1962 and 1964) uses a programming approach in an analysis of control in multiple branch organizations.

A theoretical alignment is at least implicit in the way most writers deal with such subjects as:

1) Scale economies in chain organizations. Ideas with roots in *microeconomic theory* are included in these analyses.
2) Centralization of the decision process in chain organizations and voluntary groups. The literature on *organizations* and *social psychology* has supplied certain concepts and relations.
3) The growth and the efficiency of the corporate chains as a catalyst in the emergence of voluntary chains etc. Here there is often an implicit tie-up with *competition theory* and/or *social psychology.*
4) Differences between systems in the decision base for various decisions (e.g. purchase, storage or transport activities). *Decision theory* sometimes seem to lend arguments to the analysis of the effects of uncertainty on efficiency.
5) Analyses in which purchase, storage or transport activities are included. Here the authors' arguments sometimes seem to be based on simple models from the area of *operations research.*

Although this list of possible theoretical alignments could be extended, many factors and relations must still find their justification in the authors' observations of real systems, or in their assumptions and deductions on the model level.

Some Main Types of Argument in the Analyses

Below is an account of the main types of argument chosen by some writers

to explain relations between institutional integration and the efficiency and/or growth of marketing systems. Note that a limited part only of the ideas from any one author's total writing on the subject is reproduced here.

Törnqvist (1933 and 1937). As early as the 1930's Törnqvist, the pioneer of marketing studies in Sweden, suggested that the main advantages of the chains were lower wholesale costs and lower purchase prices and, to a lesser extent, more efficient store organization resulting from the specialization of retail activities. Törnqvist's main arguments are reproduced in schedule 7: 1. The comparisons refer to chains on the one hand and independents (wholesalers/retailers) on the other. The variables that correspond reasonably well to our decision and execution integration have been placed in separate columns.

In Kristensson (1960) the increase in the size of organizations in the marketing sector in Sweden is explained chiefly on the grounds that certain environmental variables are advantageous to large organizations. (Such as technological development, credit and tax conditions, more rapid growth of industrial productivity compared with productivity in the distributive trades, and increased knowledge about the administration of large organizations.)

To Hall, Knapp & Winsten (1961) environmental variables are also important. They try to explain geographical differences in the market share of chains in terms of environmental variables such as living standard and population density, which affect the realization of potential scale economies.

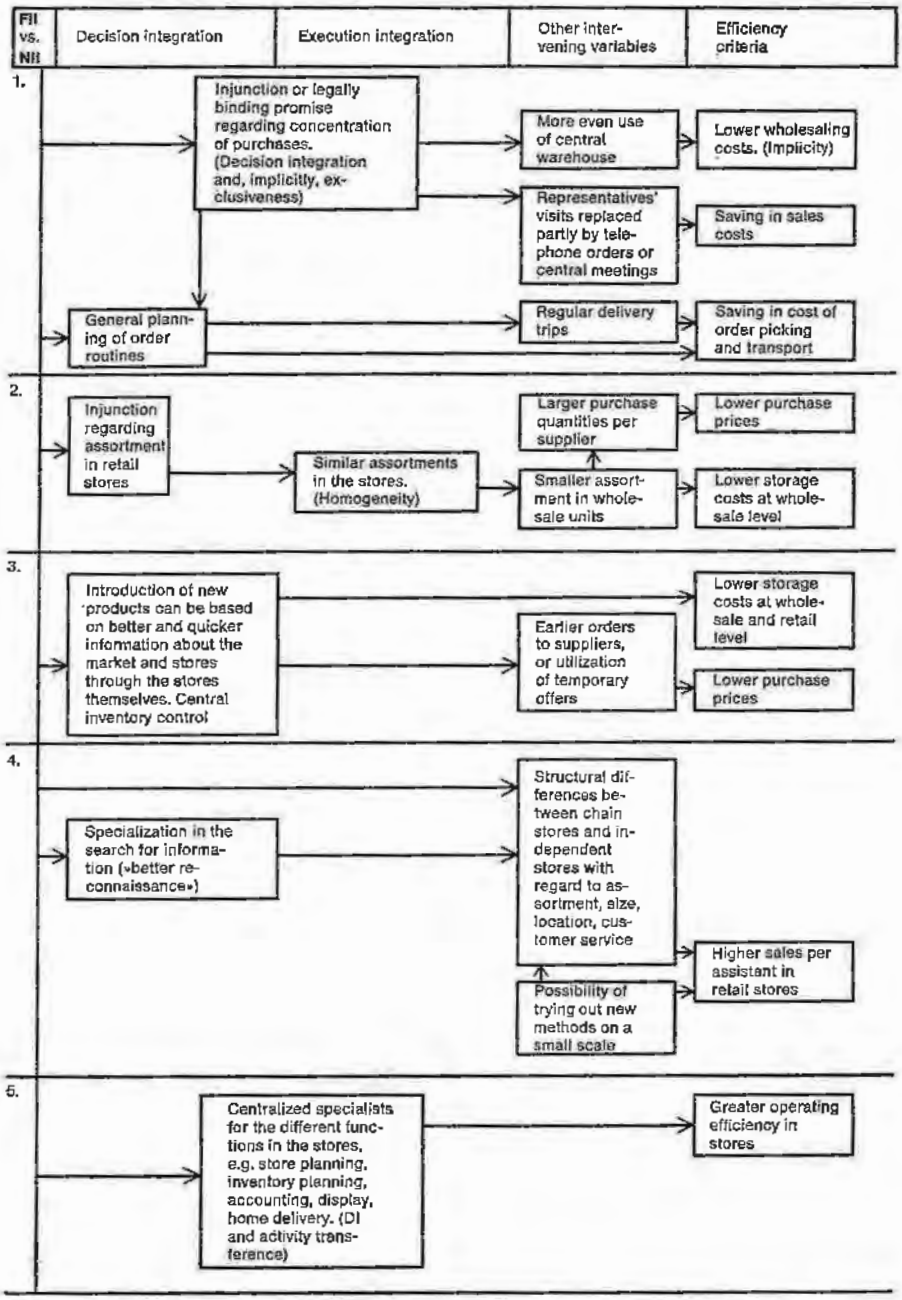
af Trolle (1963) stresses three reasons for the competitive strength of the chains: purchase prices, wholesale operations, retail operations. He considers that the chief advantage of this type of marketing system lies in the wholesale operations. The chains are said to suffer from certain inherent administrative disadvantages. The independents, by cooperating in voluntary chains etc., can attain similar advantages as the chains.

Heflebower (1959) considers that the growth of the chains in the USA during the first half of this century was the result of two marketing innovations by the chains: first, the coordination of wholesale and retail operations under one ownership and the rationalization of retail activities resulting in lower costs, and, secondly, the chains' offer of a new and cheaper "product" in the form of reduced service to the consumer.

Fulop (1962 and 1964). In two books this author provides what is probably the greatest number of arguments in the literature with which we are concerned here. She tries to explain the growth of chains and voluntary chains in Great Britain during the last decade. In the many arguments discussed, we can distinguish four main types. First those in which our integration variables (i.e. II, DI and EI variables) are included more or less explicitly. Secondly, reasons that could be an expression of expansionist marketing policies in systems of any type from FII to NII. Thirdly, she mentions changes in many economic, technical and social environmental variables, all of which favor the

Schedule 7:1 *Törnqvist's Analysis of Relations Between Institutional Integration and Efficiency. System with Full Institutional Integration, FII, Compared with System with No Institutional Integration, NII*

From Törnqvist (1933, pp. 39 ff.) and Törnqvist (1937, pp. 26 ff.).
Approximate equivalents to the concepts used in the present study are indicated by the placing of the variables and the comments in brackets.



large organization. Finally, she emphasizes the pressure of competition from more highly integrated systems as a major cause of the rise of institutionalized cooperation between independents (voluntary chains etc.) and points out that these latter systems have tended towards fuller integration in various respects.[4]

The above very limited survey gives us some idea of the multitude of arguments presented by the literature. Sometimes, of course, differences can be explained by differences in the aims of the studies, in their empirical alignment or in the integration concepts used. All this makes any sort or survey difficult. On the other hand, many relations are in fact analysed in very similar terms by many authors. There is often considerable overlapping between the arguments of different authors. In attempting to review most of the arguments found in the literature, I have compiled a survey, presented in a series of schedules below.

Summary of the Analyses Found in the Literature of Marketing

The systematic summary in the following schedules is based chiefly on a detailed study of the work of six authors (or groups of authors).[5] First I organized each author's presentation according to an outline, as in schedule 7: 1 above. I then found that many of the analyses overlapped with each other; sometimes one argument could be regarded as part of another author's more detailed analysis. Such features have made my summary possible, and have kept it within reasonable proportions. It was often necessary to combine parts of one author's argument with the argument of another, with the consequent risk of an interpretation that may not always correspond exactly to the authors' intentions. Nor should we forget that the various works may have been geared to different concepts or different empirical alignments.

My survey of the six authors was then supplemented by a review of some 15 further works. Some of these supplied arguments or parts of arguments not already covered by the six.[6] The final summary presented in schedules 7: 2—7: 7 below should therefore cover much of the analysis of integration

[4] This last type of explanation appears in many works. It seems to be closely related to Alderson's *survival theorems* (Alderson, 1957, Chapter 2), to Duddy & Revzan's discussion of *institutional adaptations* (Duddy & Revzan, 1953, Chapter 13), and to the concept of *intertype competition* (Palamountain, 1955).

[5] Fog & Rasmussen (1965), Fulop (1962 and 1964), Hall, Knapp & Winsten (1961), Mueller & Garoian (1961), af Trolle (1963), Törnqvist (1933 and 1937).

[6] Analyses have not been included if they expressly concern integration in a sense deviating from that used here, or concern production only, or systems for non-convenience goods only.

and efficiency, as it appears in the marketing literature. To check any undue influence from my own understanding or interpretation of the literature, a research assistant checked the agreement between the presentations of the various authors and the summaries in the schedules, after which some alterations were made. A full list of sources is presented in appendix 7: 1.

The summary is presented in five schedules. Four of these concern efficiency criteria, while the fifth describes the effect of environmental variables.

Type of efficiency criteria etc.	Schedule no.	Relation no.	Page no.
Efficiency in wholesale activities	7: 2	1—6	142 ff.
Efficiency in retail activities	7: 3	7—12	146 ff.
Efficiency in acquisition of goods (purchase prices)	7: 4	13	149
Efficiency of decision processes	7: 5	14—16	150 ff.
Effect of environmental variables on relations in schedules 7: 2—7: 5	7: 6	1—12	153 f.

A Methodological View of the Literature

From the methodological point of view, the literature mentioned in this chapter suffers from certain weaknesses which I shall touch upon below.

This exposé is not meant as a criticism of the various authors' treatment of the subject. We must of course take into account the often very limited purposes of their analyses. It would be unreasonable, for instance, to expect in a short textbook analysis of the reasons for the growth of corporate chains, a comprehensive analysis of concepts, a detailed account of the theoretical and empirical background, explicit and complex deductive reasoning etc.

My sole comment is that the literature as a whole suffers from weaknesses of the type suggested below.

a. *It is often unclear whether a particular study is about real systems or models.* It is therefore difficult to decide what empirical applications, if any, the various statements have. Nor can we tell whether part, or all, of the analysis is based on relations found in real systems and/or on certain postulates or logical deductions at model level.

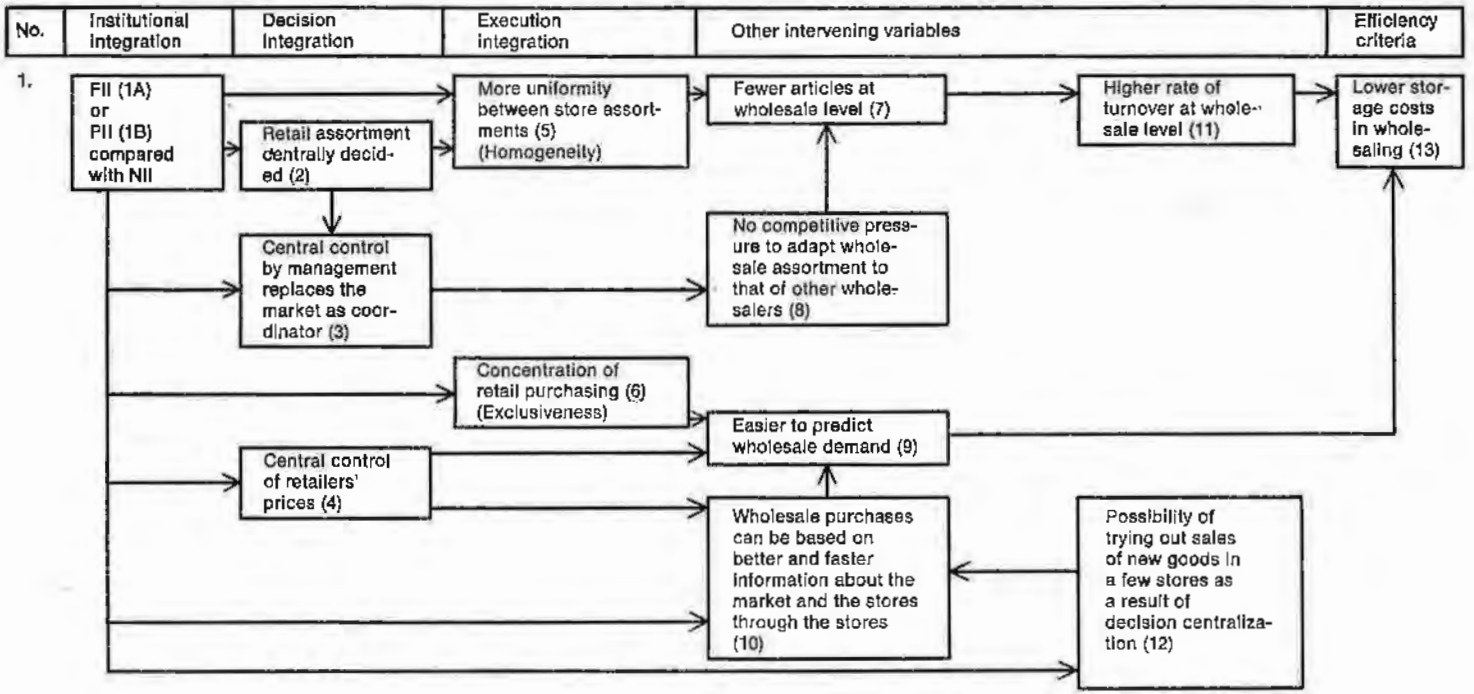
b. *Weaknesses in the system of concepts.* The reader is referred back to p. 44 for a discussion of certain weaknesses in the integration concept as it is defined in the marketing literature. Moreover, efficiency is often defined in the vaguest terms. What, for example, is meant by such frequently used phrases as "lower purchase prices", "higher sales efficiency", "less competitive power"? It ought not to be too difficult to define these and other terms, but lack of clarity has made it difficult to interpret and compare different analyses in which they appear. (Text continues on p. 155.)

Schedule 7:2 *Relation Between Institutional Integration and Efficiency in Wholesale Activities.*

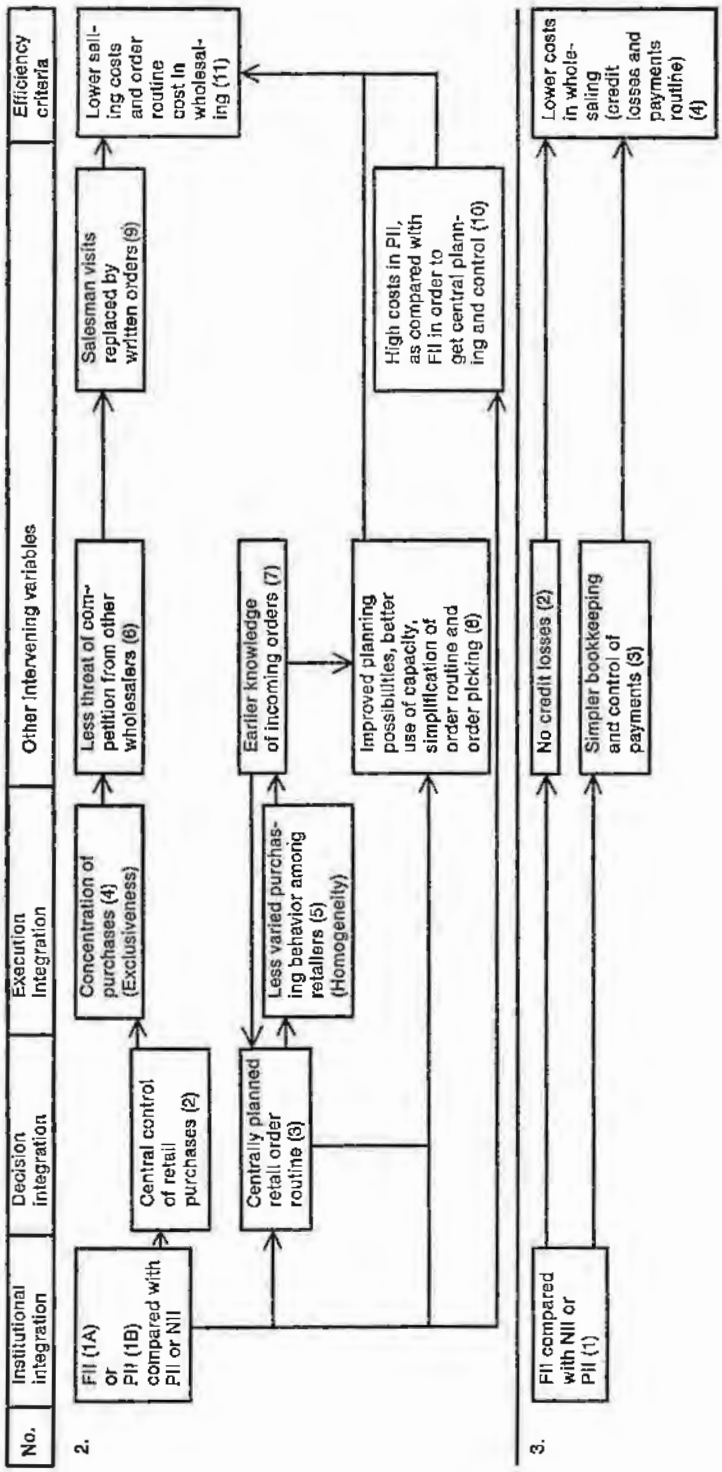
Approximate equivalents to DI and EI indicated by position of variable and by comments in brackets.

Numbers refer to list of sources in appendix 7:1.

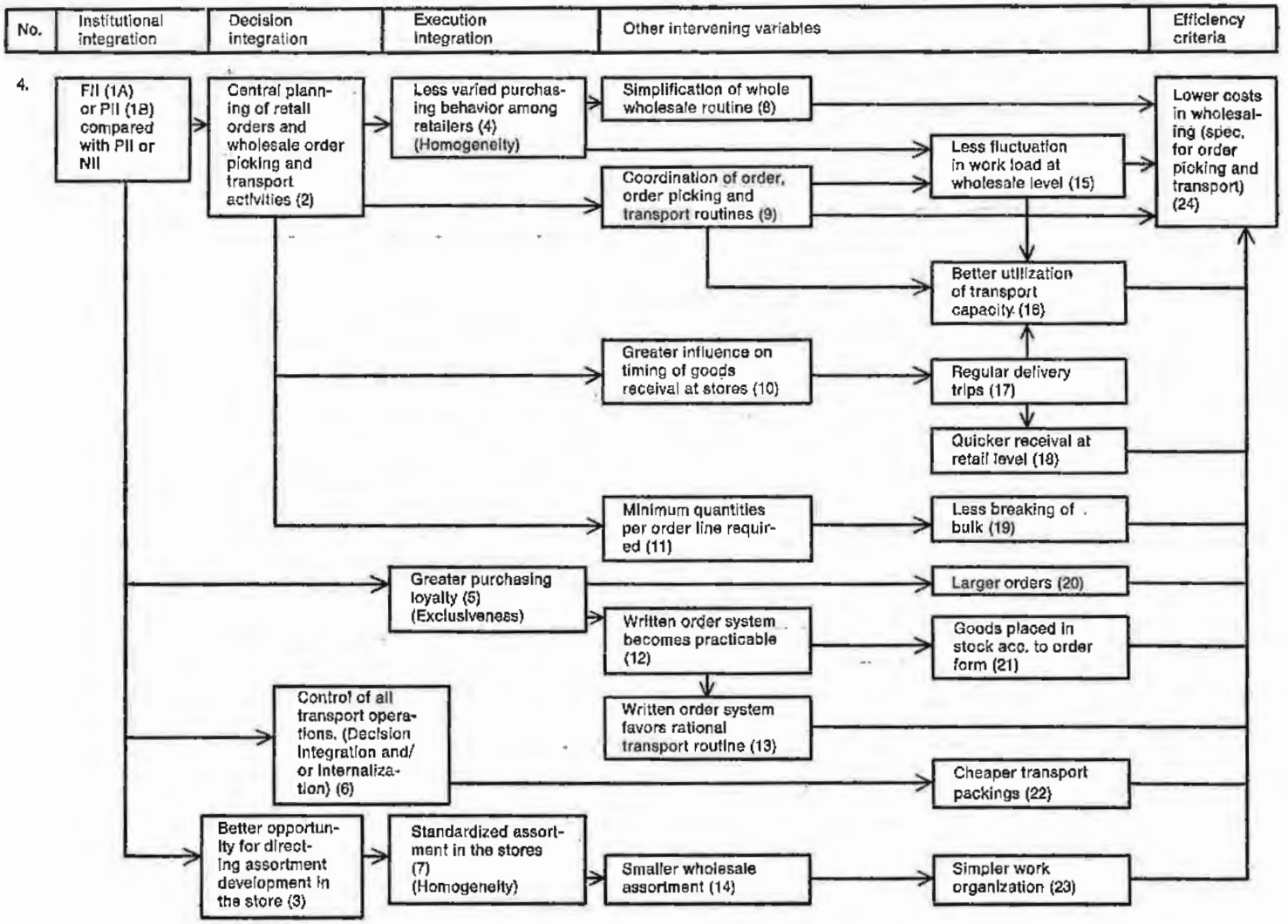
Comparisons concern systems with a higher and a lower degree of institutional integration, i.e. either FII and PII or NII, or PII and NII.



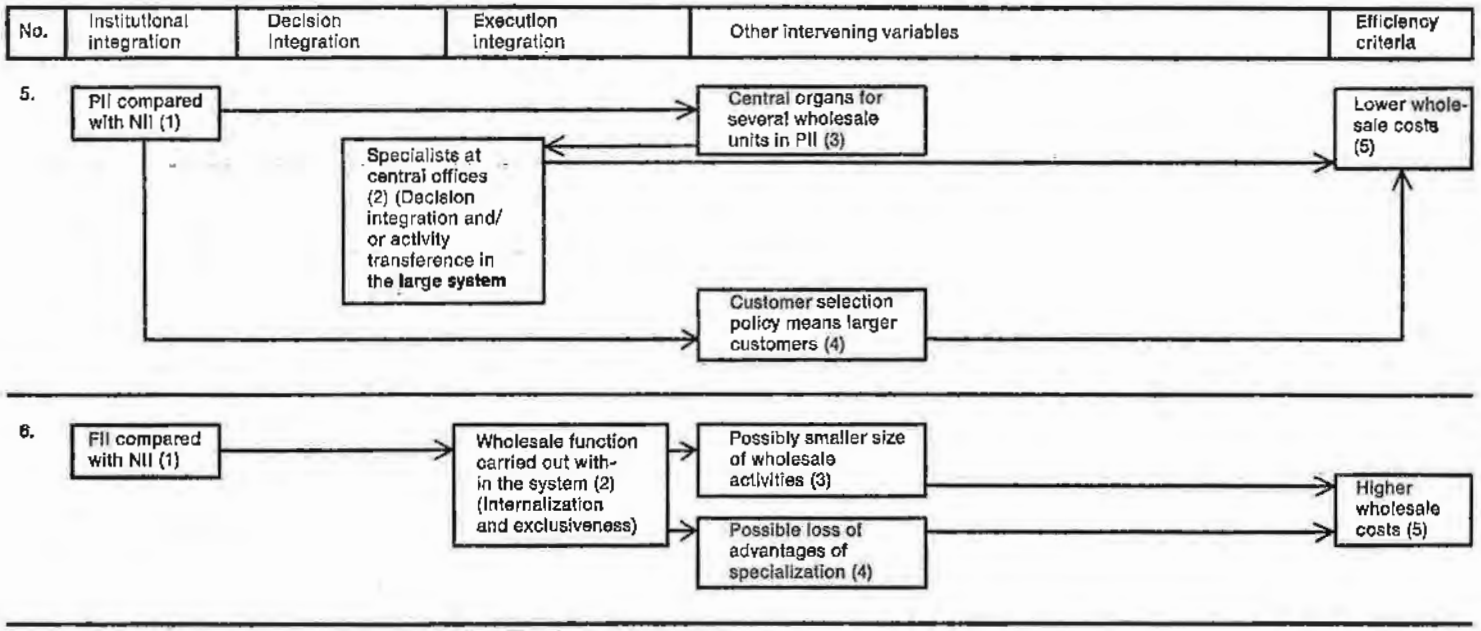
Schedule 7:2 (cont.)



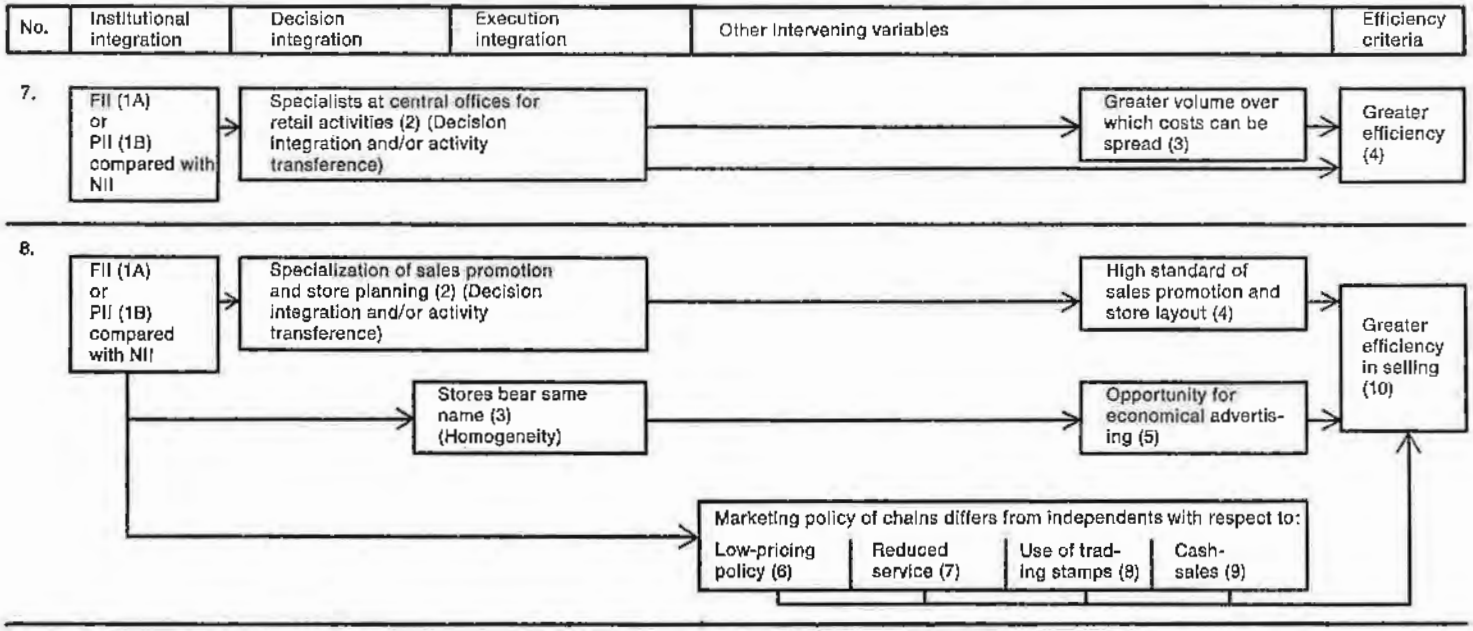
Schedule 7: 2 (cont.)



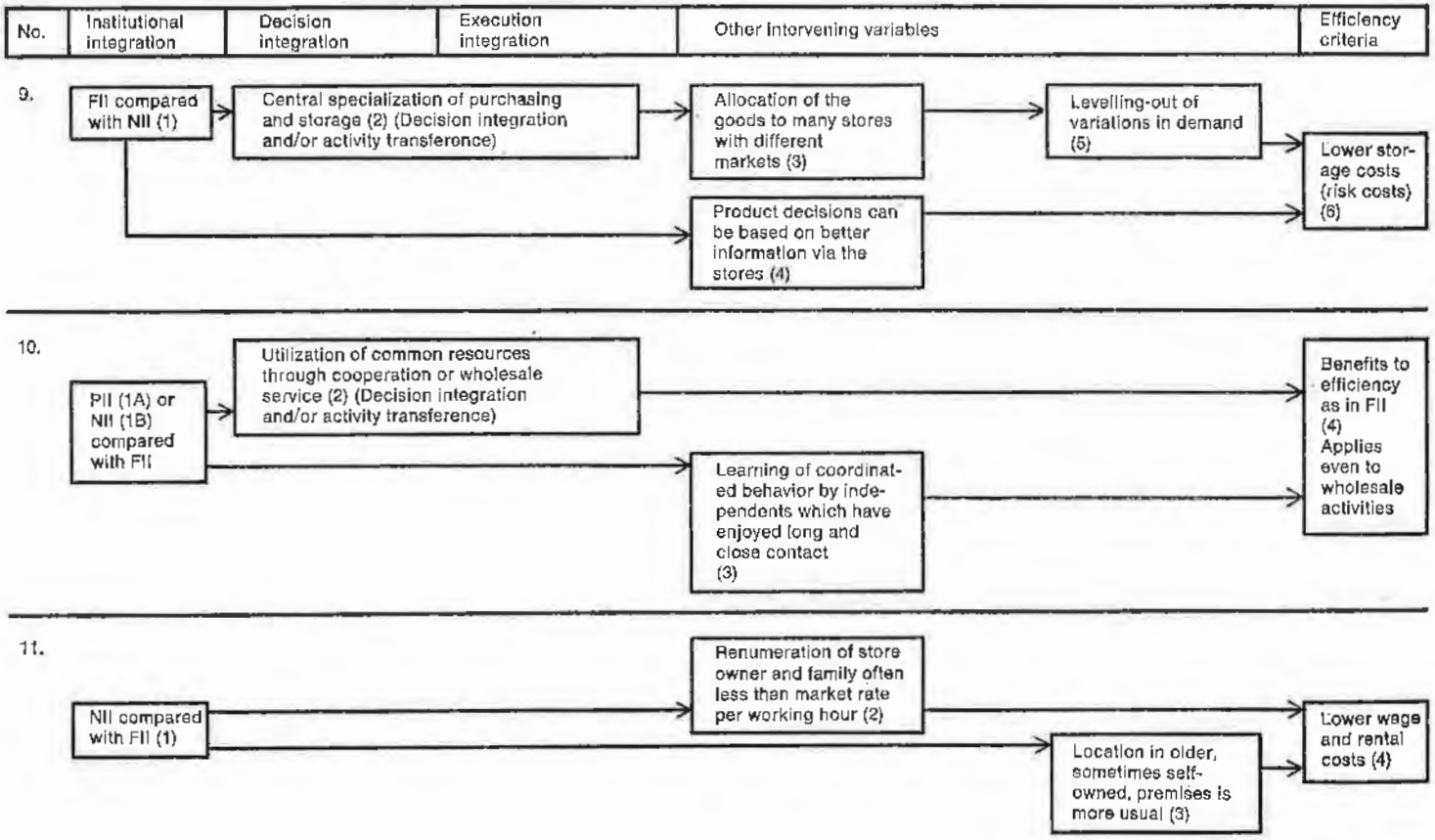
Schedule 7: 2 (cont.)



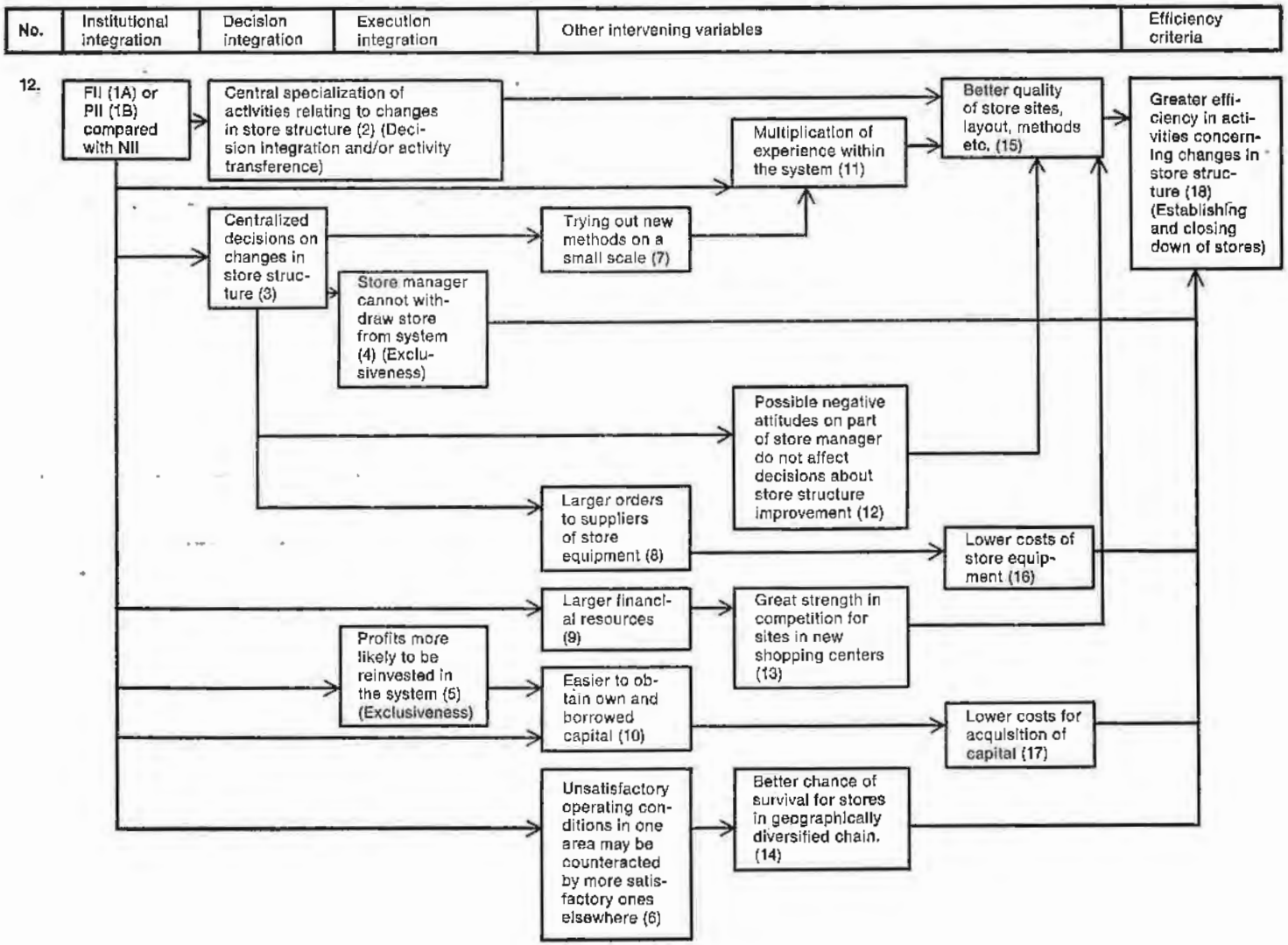
Schedule 7:3 *Relation Between Institutional Integration and Efficiency in Retail Activities.* See comments, schedule 7:2, p. 142



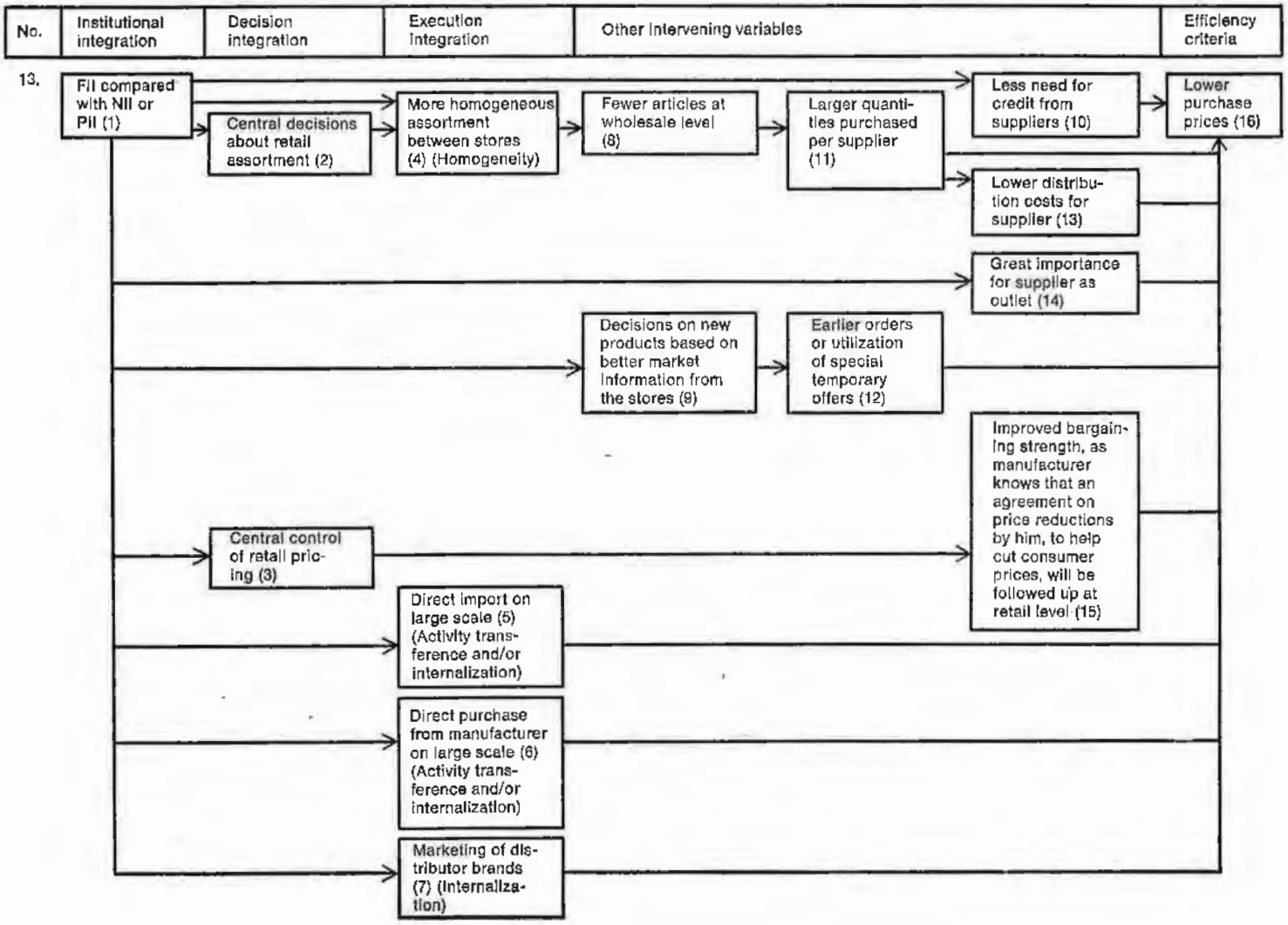
Schedule 7: 3 (cont.)



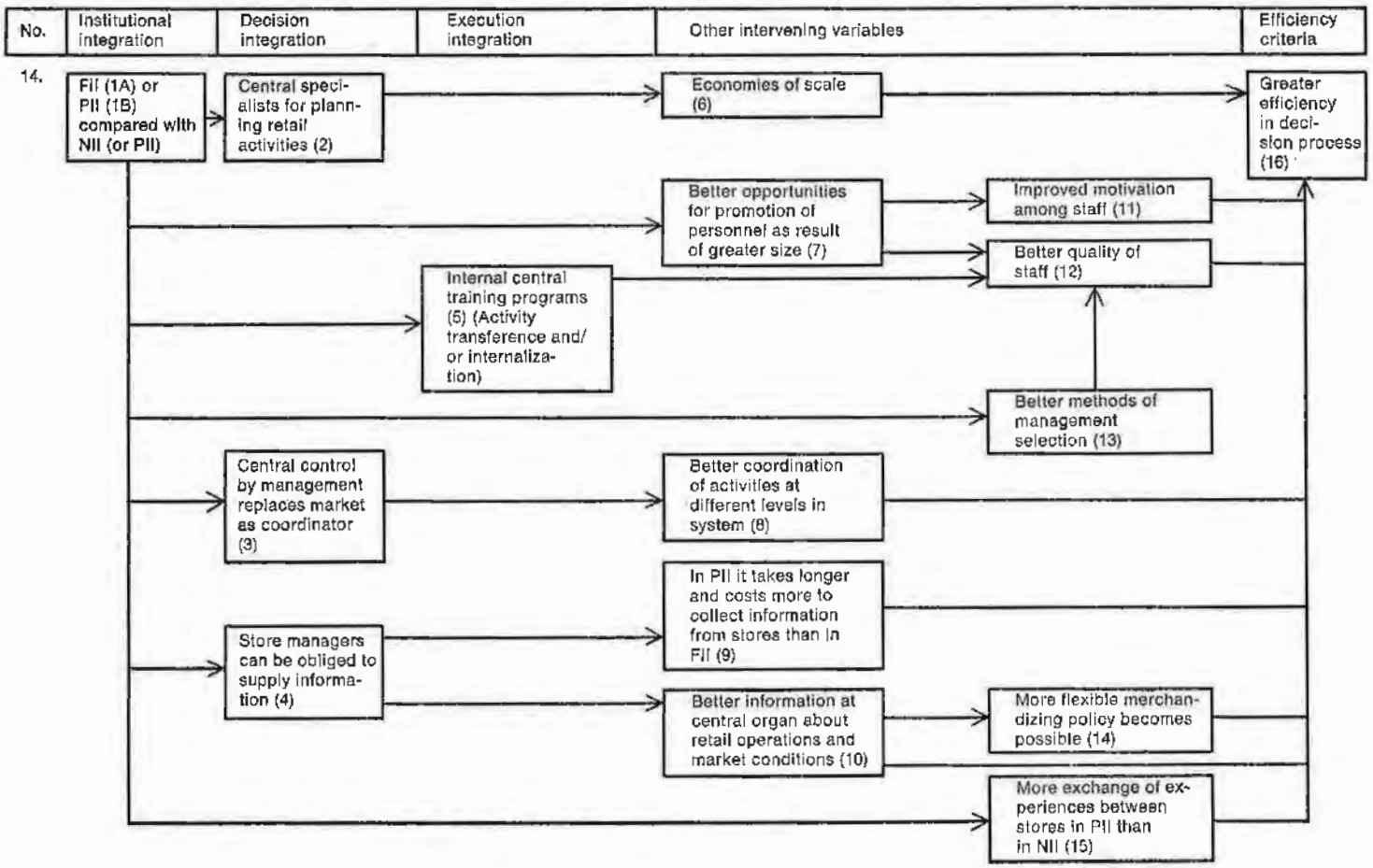
Schedule 7: 3 (cont.)



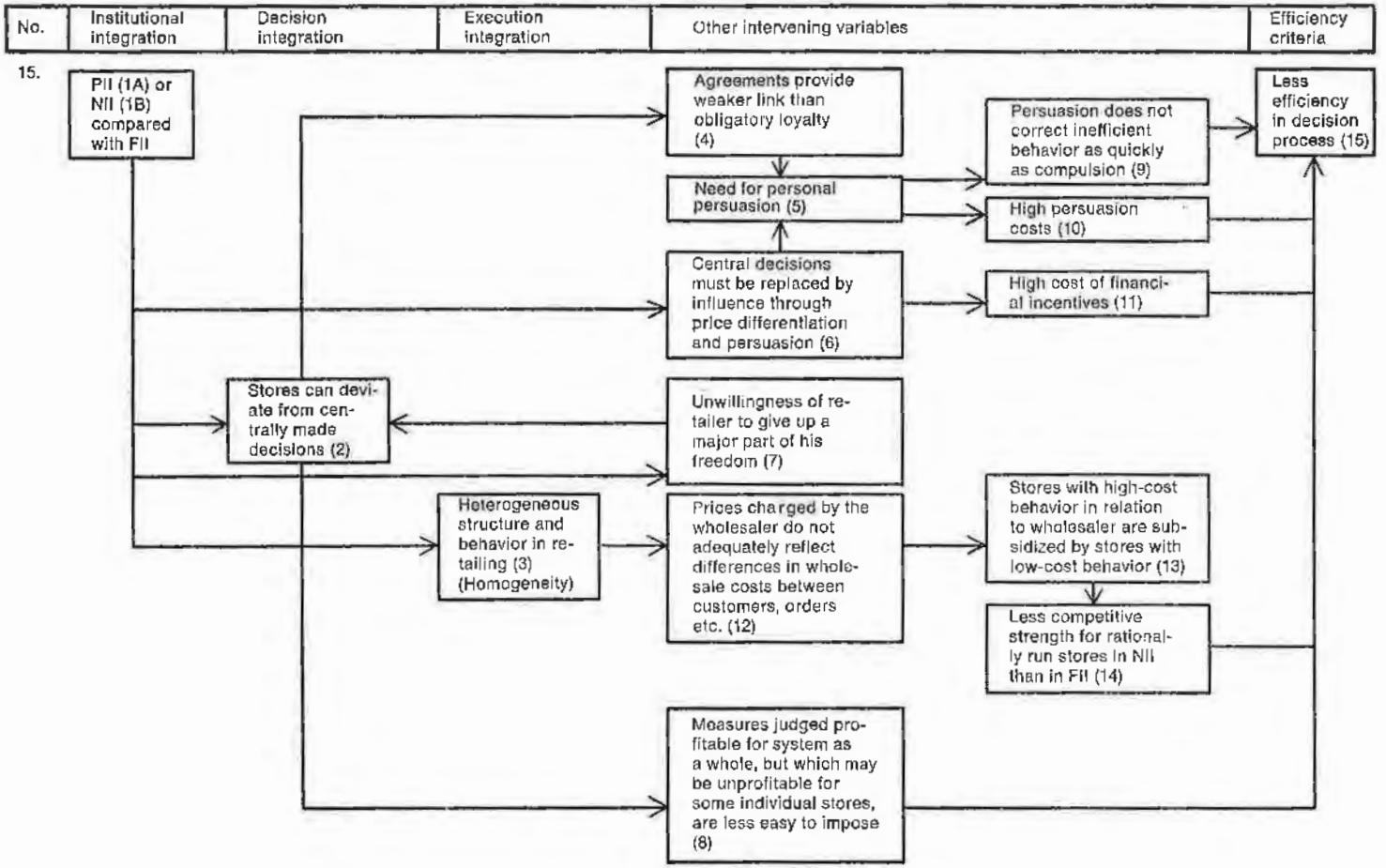
Schedule 7:4 *Relation Between Institutional Integration and Efficiency in Acquisition of Goods.* See comments, schedule 7:2, p. 142



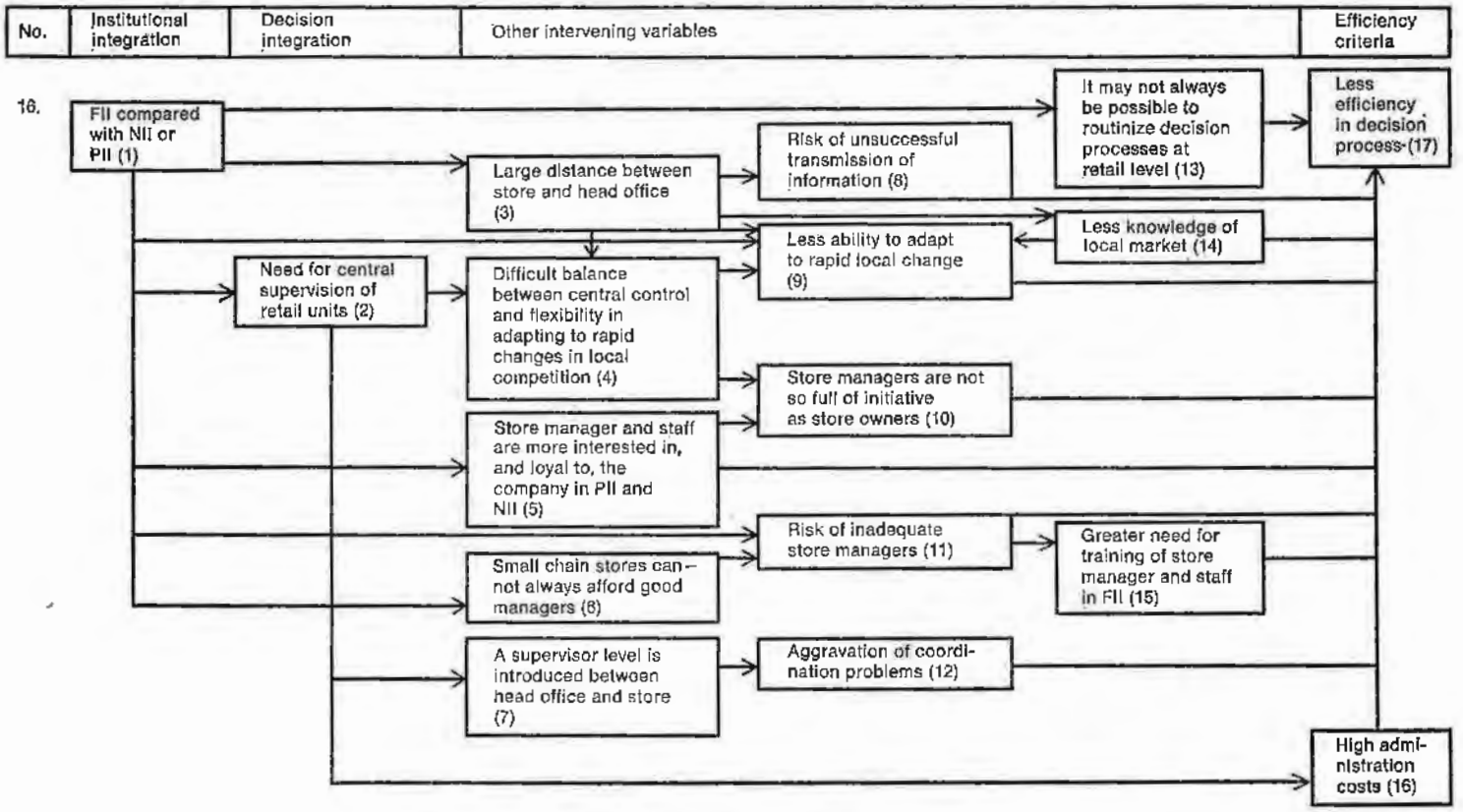
Schedule 7:5 *Relation Between Institutional Integration and Efficiency of the Decision Process.* See comments, schedule 7:2, p. 142



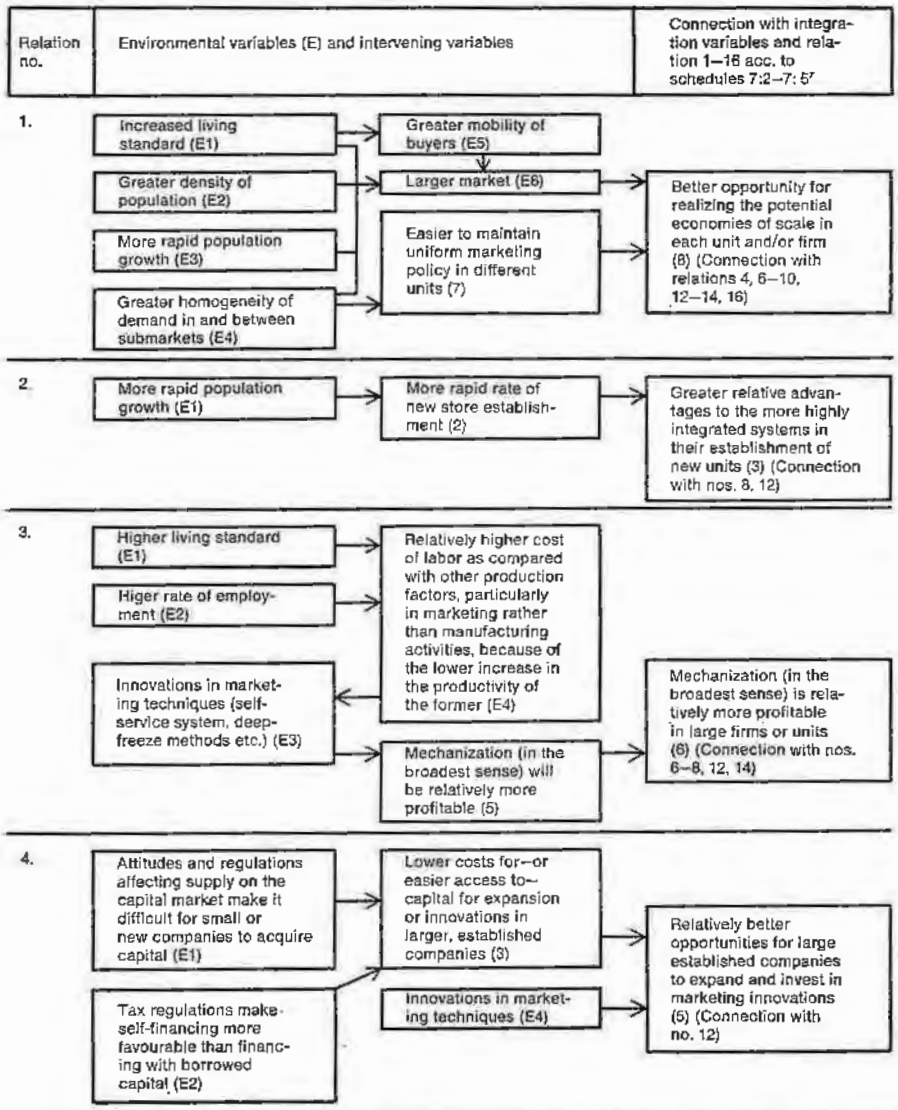
Schedule 7:5 (cont.)



Schedule 7: 5 (cont.)

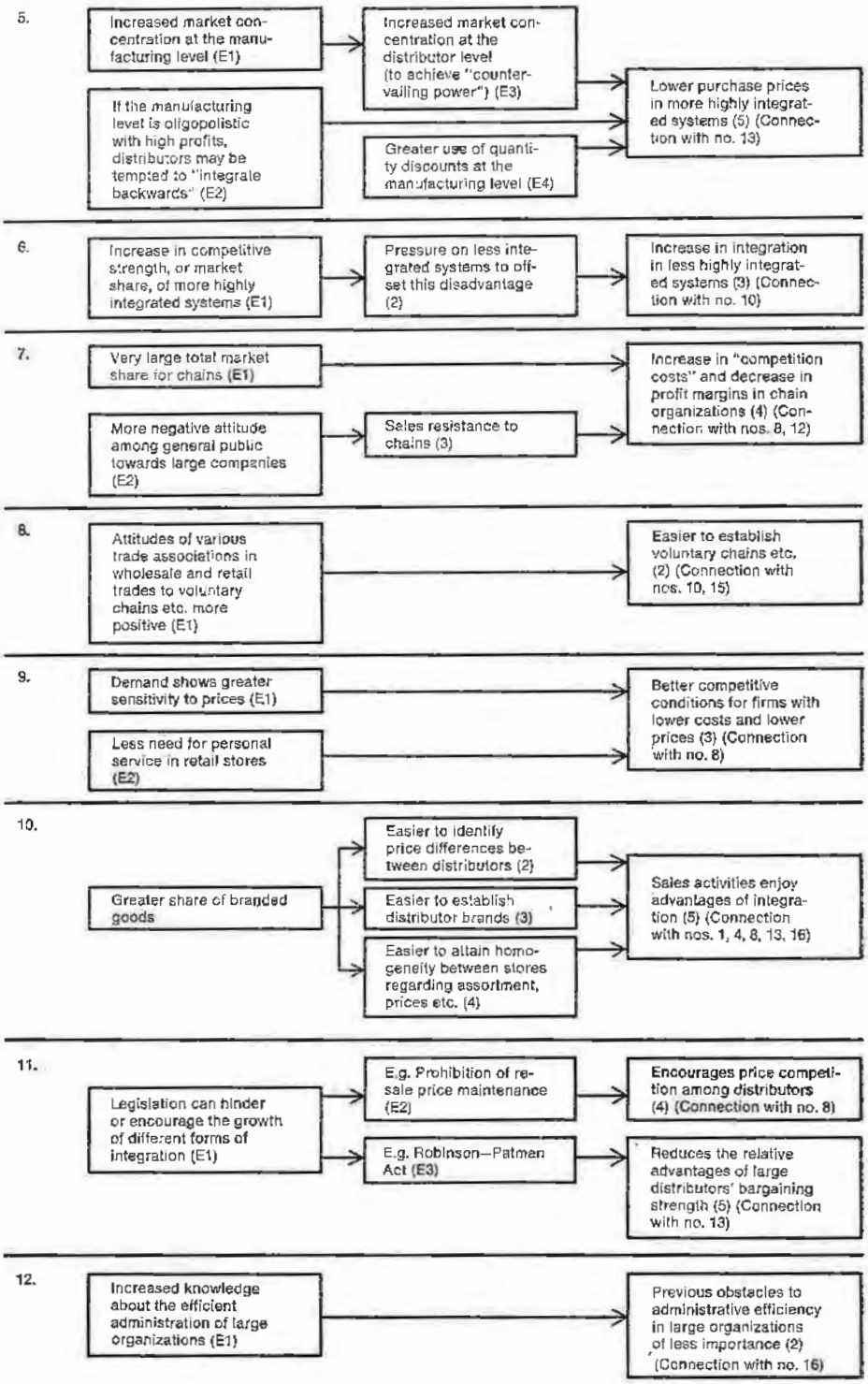


Schedule 7: 6 *Influence of Environmental Variables on Relations Between Institutional Integration and Efficiency*



[7] The connections with schedules 7: 2—7: 5 have not always been explicitly expressed by the authors of the relations appearing in the schedule.

Schedule 7: 6 (cont.)



c. It is impossible in most empirical studies to judge the *reliability of the measurements and the possible applications of the results* obtained, partly because we are told so little about the methods of operationalization and sampling, partly because we are often ignorant of what particular "population" of systems the measurements refer to. For example, many authors quote "purchase prices" among the advantages of the chain organizations; but very few studies have been published showing whether prices (including other purchasing conditions of economic value) are *in fact* lower when specific systems are compared and, if so, how much lower.

d. *Sometimes the arguments of the analyses contradict each other.* Examples of such contradictions (numbers refer to the relations in schedules 7: 2—7: 5) are:

a) Better coordination of activities at different levels in system. (14)
   Aggravation of coordination problems. (16)
b) More flexible merchandizing policy becomes possible. (14)
   Less ability to adapt to rapid local change. (16)
c) Specialists at central offices. (7)
   Possible loss of advantages of specialization. (6)

That a change in integration could be expected to have both positive and negative effects on efficiency is not remarkable in itself. It would be more remarkable if it did not. But it is desirable to be able to analyse the net effect of advantages and disadvantages. It is probably the evident weaknesses in the integration concepts that has made such analyses very rare.

Another explanation of these apparent contradictions may be that the authors are working with different implicit model conditions. For example, personal motivation is supposed to be higher in FII according to relation 14; according to relation 16, personal interest in, and loyalty to, the company is lower in an FII system. Perhaps this depends on the different authors' basic assumptions about human motivation. Or—if the relationships have been found to exist in real systems—the systems or their environments may differ in some essential ways.

e) *Rarely is any clear reason given for the choice of variables.* This question has already been touched upon in our discussion of the theoretical and empirical basis of the literature. The analyses are not usually based on any explicit model of a marketing system and its environment, to which the various variables treated in an analysis could be related. This makes it difficult to construct any system of related hypotheses or to relate different partial analytical reasonings to each other. As I have already pointed out, much of the literature consists of lists of disparate "factors" or of certain parts of the arguments summarized in the schedule above.

f) *Reasons for relations at the model level are rarely clearly specified.* Logical deductions are rarely made explicit. Look for example, at this argument which is part of relation no. 13 (p. 149): "More homogeneous

assortment between stores" means, "fewer articles at wholesale level" means "larger quantities purchased per supplier". This could have been the result of an explicit deductive reasoning if "homogeneity" had been defined and various model conditions formulated (e.g. number of articles and sales of these per retailer, number of articles included in the wholesaler's assortment, relation between wholesale purchasing behavior for a certain article, and wholesale volume per period). If we then also postulate a relationship between purchase quantity and purchase price, we could more easily link an analysis of the effect of homogeneity on purchase prices with other effects of changes in homogeneity, e.g. the effect on revenues of how successful one is in adapting individual assortments to local market conditions.

Chapter 8
Decision Integration and Efficiency

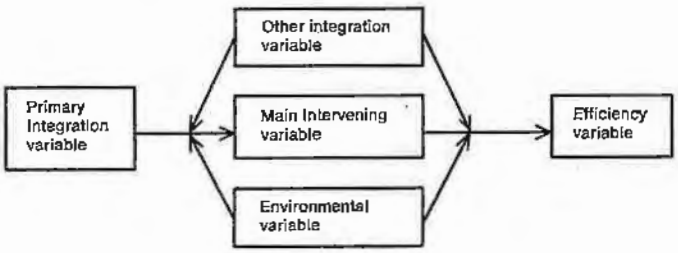
Relations between integration variables and efficiency will be analysed in chapters 8 and 9. The discussion in these chapters will be carried out at the model level. My purpose is to present a coherent, systematic analysis of what I consider to be the main relationships between integration and efficiency in marketing systems. The analysis contains only the general positive or negative direction of the relationships between the various variables. It will not even be possible in all cases to state any specific direction. The analysis leads to a series of conclusions that are summarized in chapter 10. The analysis, taken as a whole, can be labeled as a "frame of reference". (Karlsson, 1961, p. 43.) This frame of reference is intended to serve the following purposes:

a) To aid decision makers or analysts interested in relationships between integration and efficiency in specific real systems to choose variables, and the relations between variables, for further analysis.
b) To justify the general proposition underlying this whole research project, i.e. that the values of integration variables are relevant to the study of efficiency in marketing systems.
c) To provide a basis for further research in this area.

Some Introductory Remarks

The general design of the analysis involves the variables illustrated in fig. 8: 1 below.

Figure 8: 1 *Main Types of Variables Included in the Analyses in Chapters 8 and 9*



By primary integration variable I mean a variable whose changes are the subject of a specific analysis. Main intervening variable indicates a variable around which an analysis is built, because it shows relationships with both the

integration and the efficiency variables, e.g. "attributes of the decision base", "size of the activity", "number of flow relations". In each case I motivate my choice of main intervening variable by reference to the literature and/or to observations of real systems reported in appendices 8: 1 and 9: 1. The choice of these variables has of course governed, and restricted, the analysis. I have further assumed, in a general way, that various kinds of environmental conditions can affect the integration/efficiency relation; also that the analysis may be affected by conditions regarding other integration variables.

The relationships indicated by arrows in figure 8: 1 will be motivated by deductive reasoning and/or by postulates. The latter will be introduced by expressions such as "I assume", "it is assumed", or "it is postulated".

The analyses are concerned with a comparison between the states of a system during two time periods: the period before the change in integration (T_0) and the period following a change in the value of the integration variable (T_2). (See fig. 8: 2.) Efficiency in T_2 is compared with efficiency in T_0. It is assumed that environmental and "other" integration variables remain the same in T_0 and T_2, except that the primary integration variable and another integration variable can sometimes be related on purely definitional grounds. (See e.g. pp. 113 ff.) The dotted line at the E_0-level represents the assumption that, if the change in integration had not taken place, efficiency would have remained unchanged from T_0 to T_2.

The *changes* in integration and efficiency variables take place during period T_1. I have indicated in fig. 8: 2 that the variables undergo changes during this period, while in T_0 and T_2 they remain constant at certain levels. The length of the different time periods is not generally defined and the length of the periods shown in fig. 8: 2 has no general relevance.

Flows (included in an efficiency criterion) occurring during other time periods than period T_2 but considered in the analysis as being associated with activities carried out during this period (and maybe other periods as well), have to be referred to T_2. In such cases the flow is discounted to time period T_2 and is allocated to T_2 and to the other relevant periods, according to methods used in investment analysis. Flows occurring during T_2 and partly associated in the analysis with activities carried out during other time periods, are reallocated in the same way. The same procedure is followed with regard to the analysis for periods T_0 and T_1.

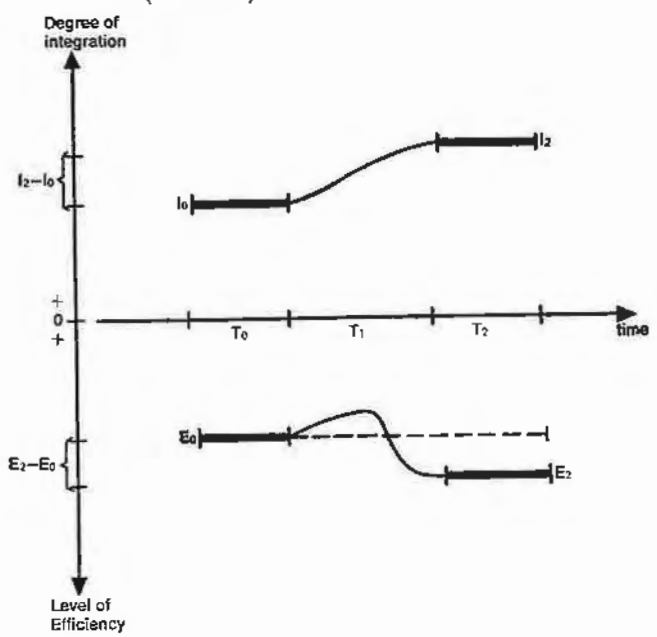
Flows occurring during T_1 and considered as being associated with the *change* in integration as such and *not with the level* of integration, are not allocated to other periods. For instance, resources used to persuade RC to accept the *change* to higher decision integration fall completely within period T_1. On the other hand, flows associated with an investment by CC during T_1 in the building of a sales consultant organization to maintain a certain DI-level are allocated to period T_2 and to other relevant periods as well. This is admittedly a rather sketchy presentation of these difficult and important

problems, but I consider it to be outside the scope of this study to discuss them in any detail.

Changes in integration are usually given as *increases*. However, a general assumption is that the opposite relationships hold in each specific case for comparisons between cases implying a *decrease*, the only exception being the separate analysis for the changeover period. Furthermore, a general assumption in chapters 8 and 9 is that the system contains only one central component.

In this chapter I shall first define what I mean by the *efficiency of the decision process*. I shall introduce some models containing variables that affect the costs and the level of goal fulfilment in the decision process. These models will be applied to various situations in which an independent retail activity exhibits *different degrees of decision integration*. The analysis will then be extended to include interdependent activities. In two sections I shall then analyse the effects of "other" integration variables, and of environmental variables, on the relations between integration and efficiency. The chapter concludes with a short discussion of efficiency during the changeover period.

Figure 8: 2 *Analyses Concern the State of the System Before and After the Change in the Primary Integration Variable.*
(See text)



Efficiency of the Decision Process

The decision process uses certain recources for its information processing: it leads to the choice of an action alternative. Its efficiency can be evaluated in terms of the quantity of input into it, i.e. its *costs* and the "quality" of its output, i.e. the degree of *goal fulfilment* associated with the chosen alternative. To know the degree of goal fulfilment we must (a) define the goal variable and (b) know the value of this variable for the chosen alternative. *Goal fulfilment* is higher, the higher the value of the goal variable. I assume here that:

a) The goal variable is determined by the analyst as the variable according to which an action alternative shall be evaluated in the analysis of efficiency.[1] This goal does not necessarily correspond to the goals of the various decision-making components in the system (p. 35). Note that the cost of the decision process is not included in the goal variable.

b) The value of the chosen action alternative is calculated ex post by the analyst, who is supposed to possess perfect information regarding the outcome.

A consequence of these assumptions is that the level of goal fulfilment can be low even if the decision maker attains *his goals* and even if, with the *information available to him ex ante,* he has chosen the best alternative.

Efficiency in the decision process is higher, the higher the degree of goal fulfilment, at given costs for the decision process, *or* the lower the costs at given goal fulfilment. No ranking is possible within the present framework, if both goal fulfilment and costs are lower in one of the cases. This is because I have found it convenient, for analytical reasons, to split the efficiency analysis into two parts, keeping either goal fulfilment or costs constant.

I postulate as main intervening variables with regard to costs: *transfer of information, storing of information, transformation of information* and *decision maker's motivation to behave in accordance with the goals of the system.*[2] The first variables are the three types of information processing presented earlier (p. 21). Motivation has been included because, in organization and marketing literature, it is often assumed that the allocation of the decision process in a system affects the components' motivation.[3] The relation between motivation and the costs of the decision process is not restricted to effects on the information processing, as will be shown later. It has therefore to be introduced into the analysis as a separate main intervening variable.

I assume further that the *degree of goal fulfilment* is affected by *attributes*

[1] I refer here to the presentation of the efficiency hierarchies in chapter 2, pp. 34 ff.

[2] Motivation is an all-embracing term for the various drives and cues influencing the component's behavior. Note, that I will always be speaking of the *motivation to behave in a certain way.*

[3] See e.g. March & Simon (1958), McNulty (1964) and relation no. 14—16, pp. 150 ff.

of the decision maker, attributes of the decision base and, in some activities, by the *bargaining strength* of the system vis-à-vis the environment.[4] *Motivation* is a special type of decision-maker attribute, which supposedly affects both costs and level of rationality. The system's bargaining strength in negotiations concerning the acquisition of goods and production factors has been chosen as an intervening variable because I assume that it can be affected by the degree of decision integration and can itself affect the favorableness of agreements with suppliers. For summary, see figure 8: 3. This figure is *not* intended to show all relationships between variables. E.g. between *transfer of information* and *attributes of decision base* or between *costs of decision process* and *degree of goal fulfilment.*

In the following two sections I shall discuss the relationship between the main intervening variables on the one hand, and costs and level of goal fulfilment on the other.

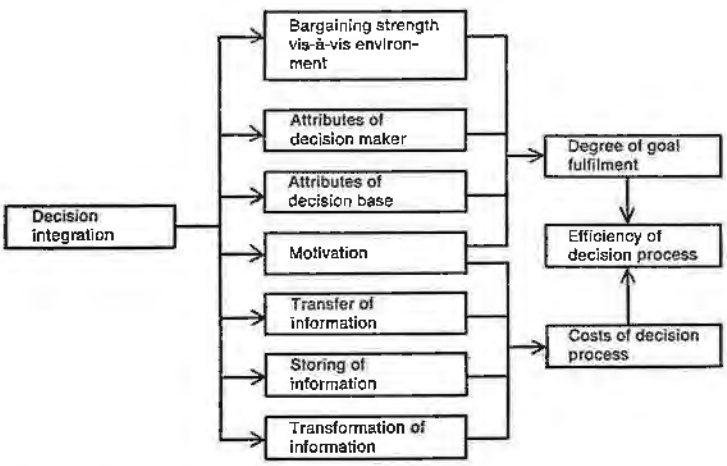
Costs of the Decision Process

The following three types of costs correspond to our three types of information processing: transfer costs, storing costs and transformation costs.

Transfer Costs

Transfer costs are divided into *transit costs* (i.e. efforts required to overcome geographical distance between sender and receiver) and *terminal costs* (i.e.

Figure 8: 3 *Summary of Main Intervening Variables Affecting the Relationship Between Decision Integration and the Efficiency of the Decision Process*



[4] The choice of the two first variables can be compared with Ramström (1967, ch. 4) and with relations 14—16, pp. 150 ff., and several of the relations in schedule A 8: 1 pp. 315 ff. For the third one, see schedule 7: 4, relations 4 and 12 in schedule A 8: 1 and studies of markets with different buyer concentration (e.g. Bain, 1959).

sender's and receiver's efforts in formulating, sending, and receiving, a message). Note that, in accordance with the altitude chosen, there is no consideration of any transmission of information within a component.

Transit costs cover the actual transmission of the message, plus any related transfer of sender and receiver to a meeting place. Terminal costs include various types of memory search, the formulation of the message (excluding the transformation activity), the send-off, and the physical and perceptual receival and acceptance of the information.

Some attributes of the information flow between components, which will be appearing in the analysis, are specified below. (Cf. general classification of flow attributes p. 16.)

Transaction = the information transferred between two components on one occasion.

Message = the part of a transaction whose *entire* information content is relevant to one or more specific decision processes. (On delimiting decision processes, see pp. 61 f.) A transaction can thus consist of one or more messages. I assume an upper limit, not generally specified, to the number of messages that can be included in one transaction.

Frequency of messages = number of messages per period between two components.

Information quantity refers to the content of the information (i.e. information in the semantic sense). Ramström (1967, ch. 5) distinguishes between the *extension of description* and the *intensity of description*. Since it is difficult to clarify in a simple way the exact general meaning of these concepts, I shall simply give two examples which should roughly illustrate their meaning. For a more precise and general definition the reader is referred to Ramström's presentation.

Example 1. Message A contains information about the average price level of three groups of merchandise on three markets during one period. Message B indicates the average price level of three groups of merchandise on ten markets during two periods; it also mentions the market share enjoyed by the system. The description is more *extensive* in message B, and thus the quantity of information is greater, since B contains information about more markets, and more periods; it supplies information not only about prices but about market shares as well.

Example 2. Message A contains the same information as in the previous example. The information in B covers the same markets and the same period as in A, but mentions in addition submarkets in all the main markets and specific points in time during the period. Message B, furthermore, not only carries information about average prices; it also provides some measure of the dispersion about each average. The quantity of information with regard to the *intensity* of the description is greater in B than in A, because B is more "detailed".

Information quality refers to the adequacy of the information as a "true" description of a particular part of "reality". The more complete, topical, correct and precise the description, the higher the quality of the information (ibid., pp. 125 ff.).

Standardization refers to the uniformity of messages in space. The greater the uniformity of content among certain messages sent from one transmitter to several recipients (or received by one recipient from several senders), the greater the standardization. Circulars from central component to retailers, and reports on identical report forms from retailers to central component, are examples of highly standardized messages.

Routinization refers to the uniformity of messages over time. The greater the uniformity of content among messages sent between two components during a particular period, the greater the routinization.

Variables Affecting Terminal Costs. The terminal cost per message will be *higher:*

a) *The greater the quantity or quality of the information per message.* This statement follows from the assumption that the time required for composing, sending off, receiving and accepting a message will be longer, the greater the quantity or quality of a message.

b) *The lower the frequency of messages between sending and receiving components.* I assume that components learn to exchange information with less waste of time as the number of messages transmitted between them increases. I assume that they can "understand" each other better, and use less expensive media (e.g. telephone instead of face-to-face contact), as their knowledge of each other grows with experience.

c) *The lower the total number of messages of which the component is either sender or receiver.* The number of messages is a measure of the size of the terminal activity. I assume that there are certain scale economic advantages in the activity. Smaller size offers less opportunity for realizing these, and costs will be higher.

d) *The lower the number of messages transmitted per transaction.* I have assumed that there is a fixed terminal cost per transaction that is independent of the number of messages it contains. (E.g. cost of waiting at face-to-face meetings.) Note the upper limit on the number of messages in a transaction that I postulated above.

e) *The lower the routinization of messages transferred between the respective pairs of components.* I assume that the time required for composing and accepting messages is longer, the less the messages resemble each other.

f) *The lower the standardization of the messages sent or received by a component.* The same assumption as for (e) applies here.

g) *The lower the motivation of the recipient to receive, or the sender to send, the messages.* It is assumed that the sender will have to spend more time composing the message and in contact with the recipient to make him re-

ceive and accept it, if the recipient's motivation to take part in the transfer of information is lower. Lower motivation at the sending end is assumed to mean that the sender is less "productive" in his terminal activity.

The total terminal costs of a period in a given system is higher, other things being equal, if the number of messages and/or the average cost per message is higher. The cost-raising effect of a greater number of messages, however, is partly offset by the reduction it causes in the cost per message according to (b), (c) and (d) above.

Variables Affecting Transit Costs.[5] The transit costs per message are higher:

a) *The greater the distance between sender and receiver.* This includes also the distance that sender or receiver are transported for the purpose of achieving face-to-face contact. This follows from the assumption that, with a given medium, the time required for overcoming the distance and/or the cost of using the medium, will increase with the distance.
b) *The lower the number of messages transferred per transaction.* I assume that most transactions have some "excess capacity" which can be used for the sending of further messages at little or no additional cost. For example, the cost of transporting the people to a meeting-place is assumed within broad limits to be the same, regardless of the number of messages transferred in the course of the meeting.
c) *The higher the quantity of the information per message.* I assume that the time required, or any other cost-affecting factor in the transmission of a message, will increase with an increase in quantity.

The total transit costs of a period in a given system are higher if, other things being equal, the number of messages and/or the transit cost per message is higher.

The variables that affect transfer costs in the system are summarized in figure 8: 4. The organization literature provides some support for the assumptions made above with regard to transfer and transit costs. (March & Simon, 1958, ch. 6; Ramström, 1967, ch. 7).

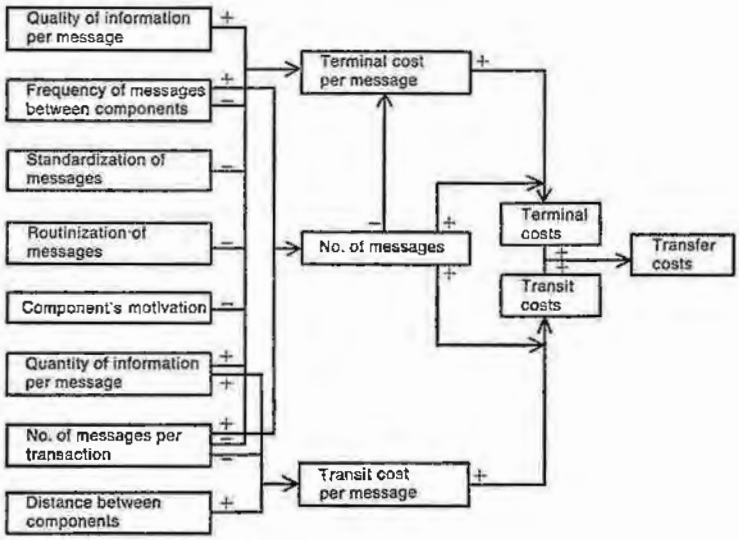
Storing Costs

The costs of storing information refer to the effort required to keep information in mechanical and mental memories. The efforts required to introduce information into the memories, and to search for it there, are also included unless they belong to the transfer or transformation activities. I assume that

[5] The medium used is assumed to affect the specific nature of the general relationships in (a), (b) and (c), but I will not discuss any such differences here. See e.g. Ramström (1967) and Thorngren (1967) where the medium for transmission of information under different circumstances with regard to distance, subject area, standardization etc. are studied.

Figure 8:4 *Variables Affecting Transfer Costs in the System During One Period*

+ and — indicate positive and negative relationships between two variables. This figure is not intended to show relationships between variables in the left column e.g. between quantity and quality of information.



some loss in information quantity and quality occurs during the storage time. This loss is defined as the difference in information quantity or quality, for a specific part of the information, between the times of entry and of exit. It is assumed that this loss is to some extent controllable, since the component can choose to utilize a memory with high or low ability to retain information (e.g. a filing system or an individual with "poor memory").

The storing costs per component during a period are higher:

a) *The higher the quantity of the stored information* (at a given quantity loss). It is assumed that the capacity of a certain memory is limited, so that more information will demand greater capacity for information storage, e.g. more people engaged on keeping files. However, the costs *rise degressively*, because I have assumed that the activity enjoys various economies of scale (e.g. use of specialized resources and higher utilization of the memories' capacity).

b) *The longer the storing time* of a particular part of the stored information. The limited capacity of the memory will he occupied longer. Losses in quantity and quality are assumed to be higher, the longer the storing time. To keep such losses down to a given level, more costly methods of storing have to be used, the longer the storing time.

c) *The lower the permitted loss in the quantity* of information stored during a

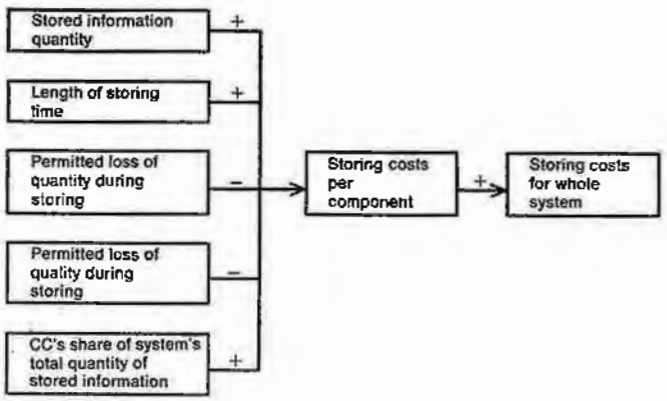
particular storing period. I assume that memories that can retain information with less loss, cost more to use.

d) *The lower the permitted loss in the quality* of stored information. This statement is based on the same assumption as above.

e) *The higher CC's share of the system's total quantity of stored information.* The quantities of each separate component are added together to find the system's total quantity without any deductions for "double counting" of identical information items in several components. The statement refers to the average cost per component and rests on the assumptions that scale economies exist (see (a) above) and that CC is the only component in the system to which a much greater quantity of information than the average quantity per component can be allocated.

The *storing costs in the system* are higher if, other things being equal, the average storing cost per component is higher.

Figure 8: 5 *Variables Affecting Storing Costs in the System During One Period*



Transformation Costs[6]

The analysis of transformation costs will refer to the concept of *decision step* that was introduced earlier (pp. 61 f.).

The *transformation costs* in a component during one period, at a given level of goal fulfilment, are higher:

a) The greater *the number of decision steps in the component.* Each decision step is assumed to make claims on resources for the transformation activity.

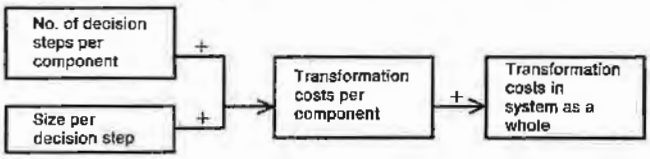
b) The greater *the size per decision step.* Other things being equal, I assume that if a decision step implies a greater reduction in the number of elements, more resources will have to be used in the transformation activity for that decision step (at a given level of goal fulfilment).

Statements (a) and (b) imply that standardization and routinization of

execution processes by means of general decisions ("programs") will reduce the costs of an activity's decision processes.[7] (See, e.g. March & Simon, 1958, ch. 6.) Some decision steps can then apply to several decision processes; this means fewer decision steps per component and/or smaller size on an average per decision step.

The *total transformation costs* of a period in a given system are higher if, other things being equal, the transformation costs per component are higher.

Figure 8: 6 *Variables Affecting Transformation Costs in the System During One Period (at Given Level of Goal Fulfilment)*



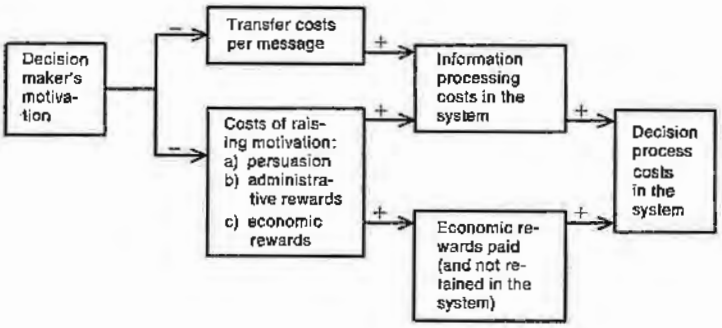
Motivation

If the decision maker's *motivation (to behave in accordance with the system's goals) is lower:*

a) *Transfer costs per message are higher.* This statement rests on assumptions given on pp. 163 f.

b) *Costs for raising motivation to a certain level are higher.* I assume motivation can be raised through actions by other components in the system, and that the measures used will give rise to costs. The costs thus engendered can be information processing costs geared to persuading the component

Figure 8: 7 *Variables Affecting the Relationship Between Decision Maker's Motivation and Decision Process Costs in the System During One Period*



[6] Transformation of information is a concept that was defined on p. 21.

[7] The standardization and routinization of messages was defined on p. 163. The concepts are analogously defined for execution processes.

whose motivation is to be raised by training, committee work, use of sales consultants etc. (*persuasion costs*). Furthermore there may be costs for administering and paying for an *economic rewards system* (including e.g. special discounts, wage rates etc.). Finally, there may be information processing costs related to the application of an *administrative rewards system*.

Level of Goal Fulfilment of the Decision Process

The main intervening variables affecting the relation between decision integration and the level of goal fulfilment are: *attributes of the decision base, attributes of the decision maker, bargaining strength* vis-à-vis the environment, and decision maker's *motivation*.

Attributes of the Decision Base. The information available to, and used by, the component in a certain decision process is said to constitute the *decision base* of that process (Ramström, 1967, p. 48). I assume that the level of goal fulfilment is higher if the quality and the quantity of information included in the decision base is greater.

It is further assumed that these relationships apply up to certain limits only; beyond these limits further additions to the quality or quantity of the information in the decision base will not make any difference to the level of goal fulfilment. The decision maker supposedly reaches a limit in the quantity of information he can handle; also, beyond certain limits an increase in quality will not be able to affect the choice of action alternative nor, thus, the goal fulfilment.

Attributes of the Decision Maker. Decision makers' goals can *deviate* from the system's goal according to which goal fulfilment is evaluated (p. 35). The size of such deviations can vary.[8] The greater the deviation, the lower will be the level of goal fulfilment. It is postulated that this deviation will be smaller, if CC rather than RC is the decision maker.

With a given decision base the decision maker can choose a more, or less, *consistent* action alternative. In other words the transformation activity can affect the level of goal fulfilment. The logical consistency of the transformation activity will be higher, the greater the amount of resources consumed per decision step of a given size, up to a certain limit. I base this statement on a general assumption that input into and output from a process covariate positively. Furthermore I assume advantages of scale in the transformation activity, such that there will be a higher degree of consistency when the activity occurs in a component involved in transformation on a larger scale, i.e. where the input of resources into the transformation activity as a whole is large.

[8] A deviation is defined as the difference between the system's goal fulfilment when two decision processes are compared, which are identical except that in one the system's goal is used, and in the other the decision maker's goal.

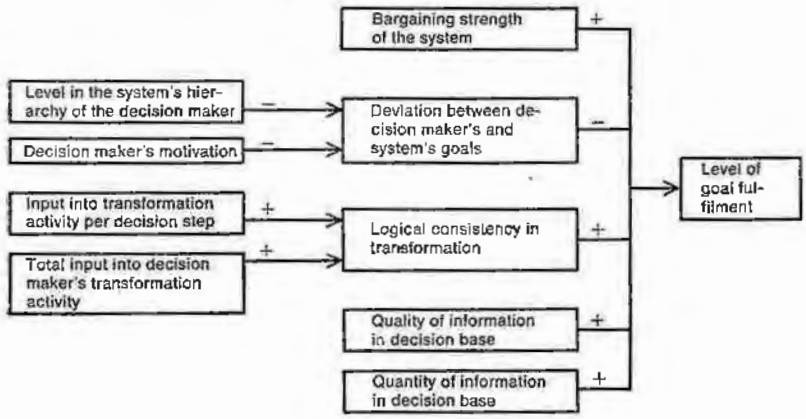
Bargaining Strength of the System. Bargaining strength is relevant as a variable only in the decision processes of activities which involve the system in negotiations, in a broad sense, about the acquisition of goods, capital and production factors. "Bargaining strength" is a complex concept that is very difficult to define clearly. I will not make any such attempt here nor, in this context, discuss the literature on bargaining. I will only roughly indicate what I have in mind when I use this term. In a negotiation between two parties, A and B, A's bargaining strength is greater if A and B believe that A's potential action alternatives may have a greater positive or negative effect on B's goal fulfilment than B's alternatives may have on A's.

I assume that the greater the bargaining strength the better will be the terms (price, quality etc.) associated with a particular action alternative in "acquisition activities". This means that goal fulfilment will improve.

Decision Maker's Motivation. It is assumed that higher motivation on the part of the decision-making component will mean less deviation between the decision maker's and the system's goals.

Variables affecting the level of goal fulfilment of the decision processes in the system during one period are summarized in figure 8: 8.

Figure 8: 8 *Variables Affecting the Level of Goal Fulfilment of the Decision Process in the System During One Period*



Decision Integration and the Efficiency of the Decision Process—Independent Activities

The degree of decision integration affects the location and extent of the information processing in the system. I shall first discuss three cases of decision integration for *one independent retail activity.* I shall also make the following assumptions: there is no activity transference; the degree of decision integration is equally strong, or weak, in all the system's CC-RC-relations; informa-

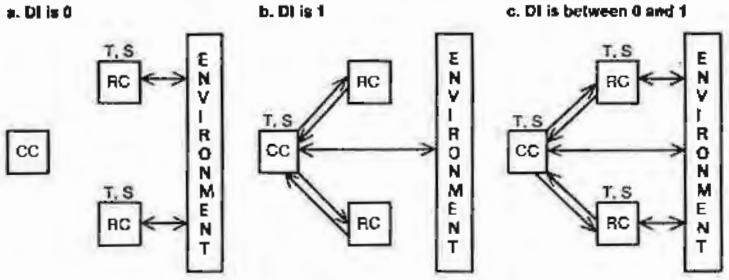
tion processing relevant to a certain decision step is located in the component carrying out this step in accordance with figure 8: 9. What the effect on the analysis would be if the location of the information processing was independent of the allocation of the decision steps, will be discussed in a further section below (p. 175). The following three cases are illustrated in figure 8: 9.

a) *When decision integration is 0,* it is assumed that all information processing takes place at RC. Thus RC even collects any information needed from the environment.
b) *When decision integration is 1,* transformation and storing take place at CC. CC also collects information from the environment and from RC. Control information is sent to RC.
c) *When decision integration is between 0 and 1,* the situation will represent a combination of the first two cases. Transformation and storing activities occur in RC and CC; CC and RC both collect information from the environment, etc.

In the following pages I shall first analyse the relationship between decision integration and the costs of the decision process, assuming a given level of goal fulfilment, and then the way in which goal fulfilment is affected when the costs are given.

Figure 8: 9 *Information Processing in Three Cases of Decision Integration for One Independent Retail Activity*

T=Transformation S=Storing →=Transmission



Decision Integration and the Cost of the Decision Process

In this section I assume a certain level of goal fulfilment. According to the analysis in the next section, DI does affect goal fulfilment. In order to keep goal fulfilment at the same level before and after a change in DI, as assumed, we may therefore have to add, or withdraw, resources from the information processing which will increase, or decrease, the costs of the decision process. In this section I will only analyse the direct effect on the costs of a change in DI. The indirect effect, via the relation between DI and goal fulfilment, follows from the analysis in the next section.

Analysis of the Extreme Cases

First I shall compare two situations, one with full decision integration and one with no decision integration (i.e. cases (a) and (b) according to figure 8:9).

Transfer Costs. If decision integration is 1 rather than 0, *transfer costs* are affected by the following factors, (a)—(e). Statement (a) below means that transfer costs are affected upwards, (c) and (d) mean that they are affected downwards; according to (b) and (e) the direction is undetermined. These conclusions follow from the model presented in fig. 8:4.

a) There are *more messages between CC and RC,* i.e. messages intended to supply the decision base with a sufficient quantity and quality of information (including review information) and messages transmitting control information. The more uniform the RCs, the greater the standardization of messages, and the smaller the increase in cost according to (a).

b) *The distance to be covered by a message between system and environment* is shorter or longer. I assume that CC is closer to some external components (e.g. suppliers) and RC to some others (e.g. consumers).

c) *There are fewer messages between system and environment.* I assume that the information collected by CC about the environment will to some extent be relevant to the decision processes of several RCs. When DI = 0, *every* RC has to collect some information which, when DI = 1, will be collected by CC only. A message will be relevant to decision processes for a larger number of RCs if the environments of the RCs are more uniform when compared with each other.

d) *Messages between component pairs are more frequent.* For CC/RC pairs this follows from the assumptions illustrated in fig. 8:9. For pairs of internal/external components, the statement is based on the assumption that the exchange of information between system and environment is concentrated to one component in the system (fig. 8:9).

e) *RC's motivation is higher or lower.* Bases for this statement are given below.

According to a number of sociological studies the motivation of a subordinate group member to behave in accordance with the goals of the group tends to be lower, other things being equal, if decision making is very highly centralized. There seems also to be support for the statement that motivation increases if there is an increase in the exchange of information within the group. (See e.g. studies referred to in Argyris, 1964; March & Simon, 1958; and Tannenbaum, 1968.) If we compare the two extreme cases of decision integration in the light of these arguments, we cannot draw any definite conclusions as to which case involves the higher motivation, since at full DI there is more exchange of information between CC and RC. Another reason for the difficulty in drawing any definite conclusion, is that concepts such as influence, autocratic leadership, participation in the decision process etc., as

used in the above mentioned literature, cannot be translated without ambiguity into terms of decision integration (pp. 49, 65). We must also take into account that the studies referred to have been made from a lower altitude than here. However, the arguments do lend some support to the assumption that full DI and no DI both result in lower motivation at RC than any degree of partial DI. In the case of full DI, this can be explained by the lack of involvement in the decision process and, in the case of no DI, by the lack of information exchange in the system. With this exception the following applies: the degree of decision integration affects motivation, but we have no grounds for an assumption about the direction of the effect. (The question of the effect on CC's motivation is not discussed.)

Storing Costs. If decision integration is 1 rather than 0, *storing costs* in the system are lower because (see fig. 8: 5):

a) *CC's share of* the system's total quantity of *stored information is greater.*
b) *The quantity of information stored per component is smaller.* I assume that a certain amount of the information stored in the separate RCs, when there is no decision integration, is identical in content. On this basis I assume further that the increase in quantity stored in CC is less than the sum of the reduction in the quantities stored in all the RCs. The reduction in stored information per component will be greater, the more homogeneous the RCs and the more uniform their environments.

Transformation Costs. If decision integration is 1 rather than 0, *transformation costs* in the system are lower because (see fig. 8: 6):

The number of decision steps and/or the size per decision step, is lower. I assume that some decision steps in CC are common to several of the decision processes of the various RCs. In an extreme case, CC could choose identical action decisions for all RCs in one decision step.

I assume that the greater the homogeneity between RCs, and between their environments, the greater is the size of those decision steps in CC that are common to several RCs. (Note that the level of goal fulfilment is to he kept at a given level in this analysis.)

Analysis of Non-Extreme Cases

We mnst now supplement this analysis of the two extreme cases of decision integration by a comparison between a higher and a lower degree of decision integration, in which neither of the cases is an extreme case.

Transfer costs are affected as follows:

a) *The number of messages between CC and RC is greater when DI is higher.* This statement is based on the assumption that the higher the DI, the more CC's control information has to be concerned with action decision processes. Control information thus has to be sent regarding a larger number of RC's action decisions. Moreover I assume that the review information received hy CC has to be of a higher quality, to preserve the level of goal fulfilment.

Thus more messages containing review information have to be transferred.

b) It is assumed that, when DI lies between 1 and 0, messages between system and environment will to some extent be divided among CC and RCs so that contact is made through the component closest to the specific part of the environment. Thus *the average distance for messages between system and environment* will be lower when DI lies between the extremes. No statement is made about any other comparisons.

c) The *number of messages between system and environment is lower when DI is higher*. Except at full or no DI, CC and RC are both in contact with the environment. I assume that every RC is involved in fewer messages as DI increases, and that some of the messages that are instead collected by CC are relevant to the decision processes of several RCs, thus reducing the total number of messages from the environment that are necessary to attain a certain level of goal fulfilment. These assumptions provide the base for the general relationship proposed above.

d) *When DI is higher, the frequency of messages per CC/RC pair is higher.* The reasons adduced in (a) above apply here too.

e) The *frequency of messages per pair of internal/external components is affected in both directions by an increase in DI*. The frequency is inclined to increase since I assume that an increasing number of external components will cease to have any contact with RCs and instead only transmit information to the system through CC. The frequency per component pair is inclined to decrease because I assume that an increasing number of external components will have contacts with both CC and RCs rather than with RCs only. Furthermore, in both cases I assume that the number of messages to the system from a certain external component is greater if the contacts are with CC and not with each separate RC. However this number is smaller than the previous sum of all transactions with all RCs (cf. (c) above).

f) *RC's motivation* has already been discussed above. Our conclusion was that motivation is higher when DI is neither extremely high nor extremely low, but that in other comparisons it is not possible to state the direction of the relation.

Storing costs are *lower when DI is higher*. This statement is based on the same assumptions as were put forward in the analysis of the extreme cases above.

Transformation costs are affected in the following ways:

a) The *average size per decision step is smaller* at higher DI. CC's decision steps are larger at higher DI and RC's are smaller. Since some of the decision steps at CC are assumed to be common to several RC's decision processes, the *average* size per decision step in the system is smaller.

b) *The number of decision steps per component is affected but the general direction of this relationship cannot be stated.* The number of decision steps

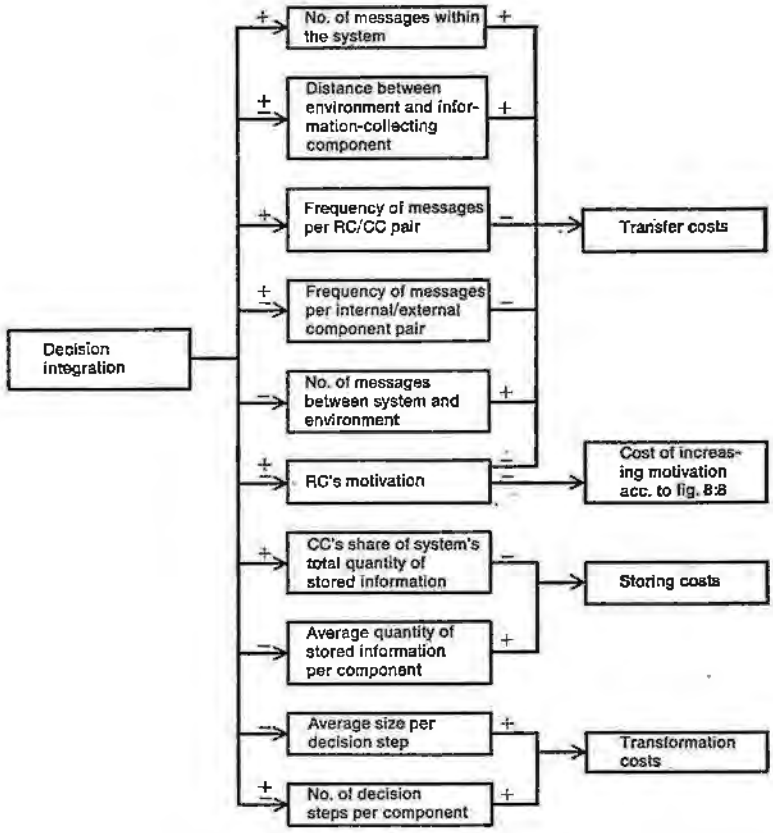
in CC is higher, or remains the same, at a higher degree of DI. An increase could depend on the addition of steps concerned with action decisions or on the greater frequency of general decisions. The number of decision steps in RC is lower, or stays the same, at higher DI. A decrease could depend on a change to fewer steps in RCs concerned with general decisions, because CC might increase the frequency of its general decisions.

The relations between DI and the costs of the decision process are summarized in figure 8: 10.

Decision Integration and the Level of Goal Fulfilment

In comparing two degrees of decision integration, at a given decision process cost, we find that the level of goal fulfilment can be affected in two ways.

Figure 8: 10 *Relationship Between Decision Integration for an Independent Activity and the Costs of the Decision Process at Given Level of Goal Fulfilment*[9]



[9] The indirect effect on the costs, via the relation between DI and the level of goal fulfilment, that was mentioned on p. 170 is not indicated in this figure.

First, directly via variables included in the model in fig. 8:8. Secondly, the cost differences found in the previous section's analysis, where a given goal fulfilment was assumed, now have to be equalized, since here I assume given costs. For example, if costs go down as a result of an increase in decision integration, the difference in costs can be used to increase the level of goal fulfilment by, for instance, increasing the quantity and quality of information in the decision base, or improving the logical consistency of the transformation activity. Since the relation between costs and the variables affecting the goal fulfilment of the decision process has already been discussed, I can refer the reader back to pp. 170 ff. With reference to the model presented in fig. 8:8, an increase in DI affects the level of goal fulfilment as follows:

a) *The system's bargaining strength is increased.* This rests on my assumption that, on a "buyer's market", CC's influence on the whole system's acquisition can have greater economic consequences—positive or negative—for the seller, than the influence of any individual RC on its own acquisition. On a "seller's market" I do not assume any such relation.[10]

b) *Deviations between decision maker's and system's goals increases or decreases.* I have assumed earlier (p. 168) that CC, as a decision maker, deviates less from the system's goal than RC. I here assume that this also applies to cases where CC's influence is greater compared to RC's, when both components are decision makers. However, the effect on RC's motivation as a decision maker changes in one direction or the other (see p. 172). Thus the net effect cannot be stated within this framework.

c) *Input into CC's transformation activity increases.* I assume that as the number of decision steps and their size increases in CC because of the increase in DI, input into the total transformation activity in CC will also increase. This will result in an increase in the logical consistency of the transformation.

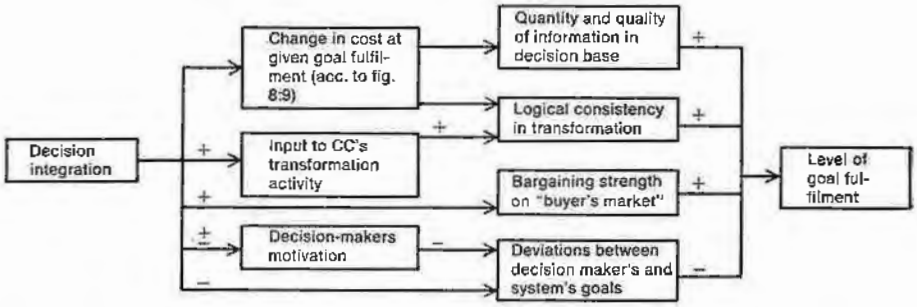
The result of the analysis is that goal fulfilment increases according to (a) and (c) and increases or decreases according to (b). For summary see fig. 8:11 (next page).

Location of Some Information Processing as Independent of Location of Decision Steps

Up to now an important assumption underlying our analysis has been that the location of the transfer and storing of information relevant to a certain decision step is completely dependent on which component is engaged in the decision step. (By definition the transformation activity involves the component in a decision step.) Thus, when DI is 0, we have ignored the possibility that

[10] Due to institutional and other restrictions on the functioning of a market and on the adjustment of production capacity, there may be a surplus of goods, production factors or production capacity in relation to demand. This situation is here characterized as a "buyer's market". The opposite situation is called a "seller's market".

Figure 8: 11 *Relationship Between Decision Integration for an Independent Activity and the Level of Goal Fulfilment at Given Costs*



CC might store information relevant only to RC's decision process or, when DI is 1, that RC might collect information from the environment and send it on to CC to be included in the decision base there. In the present section we abandon this restriction.

To begin with, assuming full DI, I shall discuss the effect on costs at a given level of goal fulfilment, of greater participation by RC in information processing (i.e. as compared with fig. 8: 9). Assume that RC, and not CC, collects certain information from nearby components in its own environment, which it then forwards to CC. This will reduce the *average distance between the environment and the information-collecting component (a)*, increase the *number of messages within the system (b)* and increase the *number of messages between system and environment (c)*.[11]

If RC stores information for later use in CC's decision base, the *number of messages within the system (b)* will increase, *CC's share of the system's total quantity of stored information (d)* will decrease, and the *average quantity of stored information per component (e)* will increase. When the number of messages in the system increases *RC's motivation (f)* and the *frequency of messages per component pair RC/CC (g)* both increase.

Assuming instead that DI is 0, we must now try to find out how the location of some of the information processing at CC will affect costs. Assume that CC, and not RC, collects certain information from nearby components in its environment. Then the *average distance for messages between system and environment (a)* will decrease, the *number of messages between system and environment (c)* will fall, while the *number of messages within the system (b)* will rise. If CC stores information for later use in RC's decision base, the *number of messages within the system (b)* will increase, *CC's share of the system's total quantity of stored information (d)* will increase, and the *average quantity of stored information per component (e)* will fall. *RC's motivation*

[11] Letters indicate the variable for easier identification below.

(*f*) and *the frequency of messages per component pair RC/CC* (*g*) will increase as a result of the greater number of messages within the system.[12]

Thus, at full DI, greater participation in information processing on the part of RC than was assumed in the above sections will lead to an increase in costs according to variables *b, c, d, e,* and to a decrease in costs according to *a, f, g*. If DI = 0, greater participation in information processing on the part of CC will lead to lower costs according to *a, c, d, e, f, g,* and to higher costs according to *b*. Thus, as far as the storing activity is concerned, full DI implies less of an advantage, cost-wise, if it is allowed that CC may participate in this activity also in systems with no DI. For transfer costs, and costs affected by motivation, no definite conclusions can be drawn about the way in which the comparison between full and no DI will be affected.

The level of goal fulfilment, at given costs, will be affected indirectly by the cost changes mentioned above. (Cf. p. 175.) Of the other variables affecting goal fulfilment according to figure 8: 11, only *decision makers motivation* is relevant. Other variables are directly connected with changes in the transformation activity and thus do not change at given DI.

We have limited ourselves here to full and no DI. Similar arguments can be put forward for intermediate degrees of DI.

Decision Integration and the Efficiency of the Decision Process—Interdependent Activities[13]

I shall now abandon the assumption that the activity under discussion is independent of other activities in the system. The retail activity for which changes in DI occur will be known as *A*. The wholesale activity that is interdependent with *A* will be known as *W*. *A* is also interdependent with retail activity *R*, if *A* and *R* occur in the same component, and with activity *A in other RCs*.[14] See fig. 8: 12.

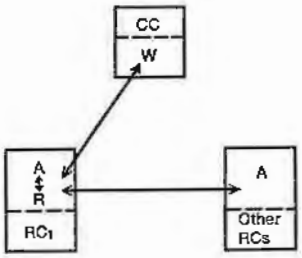
I shall analyse each type of interdependence, assuming that activity transference is 0. The efficiency criterion is *coordination efficiency*, that is the ratio between *degree of coordination* and *coordination costs*. This means that those effects on the decision process that apply regardless of whether the activities are interdependent or not, are not considered below. It also means that a change in coordination efficiency and a change in the efficiency of the decision process will not necessarily be in the same direction. The location of

[12] Grounds for these statements can be found regarding transfer on p. 165, storing on p. 166 and motivation on p. 167.

[13] Some of the concepts used in this section, e.g. interdependence, degree of coordination, etc. are defined on pp. 25 ff.

[14] Example: A=*ordering*, W=*order picking*, R=*storing*.

Figure 8: 12 *Pairs of Interdependent Activities Included in the Analysis*
Arrows indicate interdependence



information processing is here assumed to be dependent on the location of the decision steps.

Retail Activity A is Interdependent with Wholesale Activity W

I first assume given coordination costs.[15] To attain a high degree of coordination between two activities, information about the other activity will have to be included in each activity's state description; moreover the goals of each separate activity must not deviate greatly from the goal of the combination of activities.

An increase in DI means that *CC is better able to predict* the alternative likely to be chosen for *A*. CC's decision base for *W* will thus contain information of a higher quality with regard to *A*; this in turn increases the degree of coordination. Moreover, an increase in DI will raise the quality of *A's* decision base with regard to *W*, since CC's information about *W* (its "own" activity) is assumed to be of a higher quality than RC's.

We have already postulated that *deviation between system's and decision maker's goals will be smaller* when CC is decision maker. For *A* and *W* this means a higher degree of coordination at higher DI for *A*.

Furthermore, the *greater input into CC's transformation activity* that is implied by an increase in DI will increase the degree of coordination.

The conclusion we can draw from the above is that an increase in DI for a retail activity that is interdependent with a wholesale activity *increases the degree of coordination.*

We can also conclude that this increase in the degree of coordination is greater, the greater the degree of interdependence (i.e. the greater the need for coordination). Assuming instead a given degree of coordination, greater DI means *lower coordination costs* according to the following:

a) There will be *fewer messages and/or less quantity per message within the system* from CC to RC about *W* for *A's* decision base, and from RC to CC about *A* for *W's* decision base.

[15] *Coordination costs* are the costs in the decision process that arise because of the need to coordinate activities.

b) The *average quantity of stored information per component will decrease* and *CC's share of the system's quantity of stored information will increase.* I assume that the quantity of stored information in a component about the other component's activity has to be greater in order to attain a certain degree of coordination, the greater the size of the decision steps taken by the component for its own activity and the greater the degree of interdependence between the activities. By definition, RC cannot be a decision maker for W. Information about W has to be stored in CC regardless of the degree of DI for A, because CC is the decision maker for W. If, under the above assumptions, DI is increased for A, we can thus decrease the quantity of information stored in RC about W without having to increase the information stored in CC about W by an equivalent amount.

c) *Part of a component's information processing will be common* to both of two interdependent activities (Cf. pp. 172, 173).

To summarize: *coordination efficiency will increase* when decision integration increases for a retail activity which is interdependent with the wholesale activity.

Retail Activity A is Interdependent with Retail Activity R in the Same Component

I assume that DI for activity R is 0. An increase in the DI of A will then mean that CC requires more resources for the transfer and storing of information about R; at the same time, to maintain the degree of coordination, RC must start collecting more information about A from CC to include in the decision base for R. This will tend to increase coordination costs. A factor that affects the degree of coordination favorably at increased DI is that, according to our earlier assumptions, the goals of the system and of the decision maker will deviate less. However, I assume that any such deviations at a given DI will be less when both activities are carried out by the same component rather than by different ones.

Thus we can see that the effect of an increase in DI on coordination efficiency is much less definite than in the previous case. It is not possible, with the assumptions I have made, to make any general statement about whether the relation between DI and coordination efficiency is positive or negative.

Retail Activity A is Interdependent with Retail Activity A in the Other Components

Assumptions underlying the following argument are that DI increases for A in all the system's RCs, and that the number of RCs is not very small. If $DI = 0$, the activities are coordinated by the retail components' exchange of information among themselves and use of previously stored information about

other components. The number of information flow relations between internal components is then greater than at full DI, because coordination at full DI requires communication only between RC and CC. If DI is somewhere between 0 and 1, the number of flow relations will be greatest, since both the component pairs CC/RC and RC/RC will have to exchange information. However, I assume that the number of messages transferred in each pair is related in these cases to the degree of DI; thus, the higher the DI, the greater the number of messages between CC and RC and the fewer between RCs (on the general assumption that the degree of coordination is the same in the two cases). Thus the total number of messages in the system decreases with an increase in DI. This will tend to reduce transfer costs. Transfer costs will also decrease because a greater proportion of the messages in the system will now have CC as sender or receiver.

Greater DI will also reduce certain other coordination costs. CC's storing and transformation activities will expand and RC's will shrink. This will lead to advantages of scale in CC. Costs will also fall because part of CC's storing and transformation can be common to several RCs' activities.[16]

When several RCs are all carrying out the same activity, their goals may be incompatible as a result of common restrictions (e.g. on markets or resources). As we have seen, an increase in DI means that the deviation between decision makers' and system's goals, according to which the degree of coordination is calculated, will decrease.

We can conclude that when *interdependence concerns retail activities which are carried out by different components, higher DI will be accompanied by higher coordination efficiency.*

We have now seen that an increase in the DI of an activity seems to have a positive effect on coordination efficiency, provided that the activity is interdependent with either a wholesale activity or a retail activity executed by other RCs. The effect is not either definitely positive or negative, if the activity is interdependent with another activity in the same RC. If all three types of interdependence prevail simultaneously, no general statement can therefore be made about the relation between DI and coordination efficiency. It will depend, among other things, on the relative strength of the various interdependencies. Note that these statements do not imply that the effects on the criterion efficiency of the decision process are the same.

If we abandon our previous assumptions, that DI for activity R is 0, and that there is no activity transference in A or W, then the result of the analysis may be affected. This will be discussed below.

[16] Statements about transfer costs, storage costs and transformation costs are based on the models illustrated in figs. 8: 4—8: 6.

Effects of Introducing Other Integration Variables into the Analysis

We shall now look at the way the previous analysis in this chapter is affected when we consider: decision integration of other activities, execution integration, and institutional integration.

Decision Integration of Other Activities

An increase in activity A's DI will have a more favorable effect on the efficiency of A's decision process if DI is also high rather than low in the other activities. This statement is based on the following:

a) The number of information transactions need not increase so much, since there is anyway much exchange of information between RC and CC on account of the high DI of other activities. A message about *A* can therefore often be sent as part of a transaction containing messages about other activities.

b) Some information processing is relevant to the decision process of both *A* and the other activities. E.g. general review information (budget reports from RC to CC etc.), some types of market data, etc.

c) RC is assumed to be less unwilling to accept an increase in DI if it is already used to high DI in other activities. RC's motivation would thus be higher, affecting both costs and the level of goal fulfilment.

The higher the interdependence between A and the other activities, the greater are the favorable effects as stated above, *of a high DI in the other activities.* This is because I assume that, as interdependence between two activities increases, each activity will require more information about the other in its decision base. The positive effects according to (a) and (b) above will then increase. Furthermore, the reduction will be greater in the quantity of information transferred between RC and CC; first from CC about the other activities that RC needs to include in its decision base for A and, secondly, from RC about A that CC needs to include in its decision base for the other activities. See also the analysis on p. 179.

Execution Integration

I assume below, unless otherwise stated, that the EI variables and the change in DI refer to the same activities. (Exclusiveness applies to the flows related to the activity concerned.) First I shall discuss each EI variable separately; I shall try to see whether, and if so how, the level of EI alters the effects of the change in DI on the efficiency of the decision process. A general and important assumption in these analyses is that the value of the EI variable as such affects the level of goal fulfilment only through its influence on the decision process. I have made this assumption so that I can restrict the analysis to the decision process.

Activity Transference.[17] *If the degree of activity transference is higher* in one case than another, *an increase in DI will,* other things being equal, *lead to greater efficiency in the decision process.* The reasons for this are as follows:

a) For the part of the activity executed by CC, review information of a given quality can be collected at lower cost since transfer of information between RC and CC about the execution of the activity will not be required.
b) The cost for the transfer of control information will be less, since RC is executing a smaller part of the activity, and consequently will need less control information at a given DI.
c) Coordination efficiency will be higher in the three cases of interdependence discussed on pp. 177 ff., because coordination will require less exchange of information between CC and RC.
d) When activity transference is more than 0 but less than 1, exchange of information between RC and CC geared to the coordination of the CC-executed and RC-executed parts of the activity has to take place. However, I assume that this negative effect will not alter the general statement above.

Internalization. A general assumption below is that activity transference is 0.

a) If CC can specify in detail how the external component is to execute the activity, then an increase in DI will mean that the less the internalization, the lower will be the sum of the costs of transferring control information and information to influence the behavior of external components (assuming that the number of external components carrying out the activity is less than the number of RCs in the system).
b) If CC cannot instruct the external component in detail how to carry out the activity, less internalization will instead have a negative effect on the efficiency at an increase in DI. This is because I assume that the influence of the external components on RC's decision process will have to be neutralized by more exchange of control and review information between RC and CC. (Cf. p. 85 about DI and external information.)
c) The internalization of one activity, B, can influence the decision process of another, A, and thereby the effect on efficiency of changes in the DI of A. The wholesale activities of external suppliers can, for instance, affect RC's decision process for retail activities interdependent with these wholesale activities, e.g. *selling/order receival* and *choice of suppliers.* Both activities may also be retail activities, e.g. *sales promotion* and *choice of assortment.* The cost of the transfer of information in these cases will be higher, at higher DI in A, the less the internalization of B. The same reason

[17] Note the relationships between activity transference and decision integration that exist by definition (p. 71).

applies here as in (b) above. The second of the above examples can be somewhat elaborated:

Less internalization of *sales promotion* (*SP*) because external suppliers do more *SP* as compared with the system, will lead to higher costs at a higher DI in *choice of assortment*. I assume that demand for the external supplier's articles increases—or is expected by RC to increase—on account of the increased *SP*. Then the supplier will be more able to influence RC's *choice of assortment* in a direction that may be incompatible with requirements expressed in CC's control information. In order to achieve a certain degree of DI for *choice of assortment*, more information has to be exchanged between CC and RC to counteract the external influence than if the internalization of *sales promotion* was higher.

In conclusion we can say that *the greater the internalization, the greater will be the efficiency of the decision process at increased DI*, except in those cases where the external component carries out a commission on CC's request.

Exclusiveness. If the degree of exclusiveness is greater in one case than another, *an increase in DI will*, other things being equal, *lead to greater efficiency in the decision process*. The reasons are as follows:

a) We can assume that the greater the exclusiveness, the higher will be the degree of interdependence between the activities of different components (pp. 30 f.). The higher the interdependence between the activities of different components, the greater will be the coordination efficiency at higher DI (pp. 178, 180).

b) The greater the exclusiveness, the lower the costs of getting review information and/or the higher the quality of this information. In carrying out wholesale activities, CC receives information about certain retail activities. The greater the exclusiveness, the greater the extent of a certain RC activity does this information cover. An example: CC will have more complete and more up-to-date information about RC's *choice of assortment* and *choice of suppliers* through CC's own execution of *selling/order receival* and *payments routine* (*sales*), if more of RC's purchases are made from CC, and more of RC's payments for goods are made to CC.

c) At greater exclusiveness, I assume that RC's decision base will contain less information coming from external components and aimed at influencing RC's decisions. According to the same assumption as for points (b) and (c) in the analysis of internalization, this will increase the efficiency of the decision process.

Homogeneity. The effect of homogeneity has already been mentioned briefly in earlier sections of this chapter (pp. 166 and 172). Our general conclusion was that, *given an increase in DI, the efficiency of the decision process will be higher, the greater the homogeneity*. This is because messages can be more standardized, and a greater part of the information processing at CC can refer to the decision processes of several retail components.

Conclusions. We can conclude that, *given an increase in DI, the efficiency of the decision process will, with some exceptions, be higher, the greater the activity transference, the internalization, the exclusiveness, and the homogeneity.*

We have been discussing ways in which the EI variables affect the relationship between DI and the efficiency of the decision process, without considering that the changes in DI may be intended to change or maintain the degree of execution integration (p. 132). Such a change in EI could affect the efficiency of the activity and, thus, the level of goal fulfilment of the decision process. The model of the relationship between DI and the level of goal fulfilment (p. 176), together with the relationships between EI and the efficiency criterion to be found in chapter 9, implies that DI can affect the level of goal fulfilment via its influence on the degree of EI.

Institutional Integration

Given an increase in DI, the efficiency of the decision process will be higher, the higher the degree of institutional integration. The reasons are as follows:

a) It is assumed that the greater the strength of the institutional relations the less will be RC's opposition to the "loss of freedom" involved in an increase in DI. The costs of transferring control information to "persuade" RC will therefore be lower.

b) A high degree of institutional integration entails certain obligatory rules regarding the transfer of information from RC to CC (accounting system, payments routine, etc.). This means a more efficient decision process in terms of lower costs for and/or higher quantity and quality of information about retail activities in CC's decision base for these.

c) For certain activities—chiefly those concerned with the acquisition of goods and production factors and those connected with the payments flows—it is possible to derive obligatory rules about high DI from the institutional relations themselves (pp. 128 f.). If a system that lacks such institutional relations wants to achieve the same high DI, the decision process will cost more, since I assume that more messages containing control information will have to be sent to "persuade" RC.

On the Effect of Environmental Variables on the Analysis[18]

Competitive strength of competing marketing systems. The greater the "competitive strength" of the competing marketing systems, the less opposed RC will be to an increase in DI. I assume that RC will mind less about the "loss of freedom" involved if his own position on the market is less secure.

[18] The choice of these variables, and their relations to efficiency, is based partly on schedule 7:6, pp. 153 f.

Persuasion costs associated with keeping a higher level of DI will therefore be lower.

The relation between integration and efficiency exhibited by competing systems. If competing marketing systems exhibit a positive relationship between DI and efficiency, negative effects on RC's motivation will be less and the quality of the information in CC's decision base will be higher. The reasons are that I assume information about such relationships to affect the state descriptions in RC's general decision processes. Furthermore I assume that the demonstrated experience of competing systems will increase the information quality of CC's decision base for related activities.

State of information technology. The state of information technology will influence the way in which a change in DI affects efficiency (e.g. with regard to media or EDP techniques, that, for instance, can affect the cost per message or the scale economies of transformation). I will not go into any analysis of the direction of the effects. The difficulties can be exemplified by the diverse conclusions that various writers have put forward about the effect of EDP techniques on the degree of centralization in companies. (Cf. references in Ramström, 1967, pp. 255 ff.)

Homogeneity of submarkets. The greater the homogeneity of the system's submarkets with respect to competitor and consumer behavior, the more favorable will be an increase in DI. The reasons for this involve greater standardization of messages and greater "overlapping" between the decision processes of several RCs. This has been discussed earlier in this chapter.

The degree to which the system's acquisition market (for goods or resources) can be characterized as a "buyer's market". An increase in this variable will increase the efficiency improvement resulting from the relationship between DI and the system's bargaining strength.

Rate of innovation in marketing techniques. The more rapid and radical the changes in marketing technology, the more positive is the effect on the efficiency resulting from an increase in DI. This statement is based on the following assumptions: systems with high DI can adapt more quickly to the new conditions required by methodological innovations, because higher DI means more specialized decision making and a higher quality of information (e.g. new methods can be tested in parts of the system); also CC is more likely to invest in, and acquire, resources for innovations when it is also going to have considerable influence on how the resources will be utilized.

On the Effects During the Changeover Period

In conclusion I shall discuss very briefly the effects of the *change* in DI as such. These effects occur during the period of the changeover, according to the assumptions on p. 158.

During at least part of the period DI has not yet reached its final level. This means that, if efficiency as a function of DI rises or falls monotonously during the actual changeover, efficiency will be on an average respectively lower or higher during the period than at its end.

The possible advantages following an increase in DI will take time to come to fruition. This statement is based on the assumption that it takes time for personnel to learn their new tasks in the information processing, and that some of the costs for resources that will be freed in RC or CC do not disappear immediately.

The possible disadvantages of an increase in DI will be greater during the changeover period than later. This statement is based on the assumption that during this period more messages between RC and CC are needed for training and persuasion; negative effects on motivation are also assumed to be greater.

We can conclude that *an increase in DI will result in lower efficiency during the period of changeover than later, if efficiency is higher when the established levels of DI are compared.* If higher DI leads to lower efficiency, the period of the changeover may show either higher or lower efficiency. *If DI is being decreased, the same conclusions apply.* This is contrary to the general assumption stated at the beginning of this chapter, that decreases and increases in DI will have opposite effects.

Chapter 9
Execution Integration and Efficiency

The aim, general arrangement, and some general assumptions of chapter 9 were presented at the beginning of chapter 8 (pp. 157 ff.). I shall first discuss each EI variable in four separate sections; I shall analyse their relations to efficiency and the influence of the values of the other EI variables on these relations. In further sections I shall then consider the environmental variables, the changeover period, decision integration and institutional integration.

Throughout the following discussion I shall assume that changes in the value of EI are evenly distributed among the RCs in the system and among the various subactivities and dimensions of the relevant activities. For example, an increase in the *exclusiveness of the goods flows to RCs* means that all RCs have increased their purchase share from CC to roughly the same degree. Similarly a decrease in the *homogeneity* of *sales promotion* means, unless any dimensions are specified, a reduction in homogeneity in all dimensions of this activity.

I will not usually differentiate between activities in the analysis. For example, in analysing activity transference, size of the activity and efficiency, I will not discuss how different activities are affected in their efficiency by a change in activity transference. If we were to follow the analysis further, we might for instance find considerable scale economies in some activities, lesser economies in some, and none at all in others. However, in view of the broad scope of my analysis, I can only refer to activities in general, sometimes illustrating the various statements with specific examples.

The relevant efficiency criterion will be specified at the beginning of each subsection. Except where otherwise mentioned the criterion refers to the execution process, i.e. decision process costs are excluded (p. 35). The effects of EI variables on the analysis of decision integration and efficiency were discussed in chapter 8 and will not be repeated here.

Activity Transference

As main intervening variables I have chosen: the *size of the activity*, the *system's bargaining strength* and *technological coordination*.[1] I shall analyse each of these variables separately, ignoring possible relations with the other main intervening variables. In the following discussion activity transference refers to retail activities only.

Size of the Activity

The criterion here is the efficiency of the *execution* process of an *individual* activity in the system as a *whole*. This formulation is geared to the three hierarchies of efficiency criteria in figure 2: 5, p. 34. According to this figure, the present criterion is (A4, B1, C2b). Since C2b applies in almost all cases, hierarchy C will not be specifically mentioned, unless the criterion refers to another level in C.

A general assumption underlying the following discussion is that, taking the system as a whole, either the input into or the output from the activity remains unchanged. Thus the question is: does a change in activity transference lead to a change in the quantity of the system's total input into the activity at given total output from the activity (or a change in output at given input)? If the degree of activity transference increases, (a) the input into the activity of CC will by definition increase as compared with the input into each RC, and (b) a greater part of the execution of some activities will be carried out simultaneously at CC on behalf of all RCs, using the same units of input in CC.

a) In microeconomic theory the concept of *returns to scale* is defined for proportionally equal changes in the input quantity of the various production factors. Assume that activity transference is 1 rather than 0, and that the quantities and proportions of the production factors are the same in CC as those which obtained when RCs were acting components. Will the output

[1] Compare this choice with the following:

Size of the activity. Microeconomic theory and related empirical studies. (E.g. Bain, 1959; Baligh & Richartz, 1967; Holdren, 1960.) Organization theory (E.g. Price, 1968 Ch. 2). Marketing literature according to relations 5—10, 12, pp. 145 ff. Relations 8, 13, 14 in the real systems reported in appendix 9: 1.

System's bargaining strength. Economic analyses of markets with different buyer concentration. (E.g. Bain, 1959; Galbraith, 1956.) Marketing literature according to relations 12, 13 pp. 148 f. Relations 1, 6, 7, 9, 15, 16 in the real systems reported in appendix 9: 1.

Technological coordination. Treatment in the organization literature of the division of work and coordination. (E.g. March & Simon, 1958.) Marketing literature on physical distribution. (E.g. some of the articles in Marks & Taylor, 1967, section VII.) Analyses of vertical integration. (E.g. Bain, 1959, pp. 155 ff.)

from CC be greater, equal, or less, than from all the RCs together? In economic theory increasing returns to scale are usually explained by the *indivisibility* of certain production factor units; similarly decreasing returns are explained by the *limited supply of certain production factors.* (Baumol, 1965, p. 257). In our case the system's total demand for a certain production factor cannot increase very much if CC rather than RC carries out the activity, since the general assumption above was that either the system's total input or its total output was given. However, indivisibilities are assumed to exist with regard to *manpower* (e.g. specialist personnel) and *material* (e.g. machinery). Thus it follows from the above assumptions that increasing returns to scale will prevail. If instead we compare two cases where activity transference in neither 1 nor 0, we must take into account that both RCs and CC will now carry out the activity. If an increase in activity transference means that the input into CC's activity is greater than the previous input into any one RC was before the change, then the efficiency of the system as a whole will increase. This follows from our statement that increasing returns to scale apply.

If the input into CC is smaller than the previous input into any one RC, efficiency will decrease. This can only happen when the number of RCs is very small and/or the degree of activity transference is very low. I will not consider this case in the conclusions.

The concept of *scale economies* can be given a broader meaning than that attached to the concept "returns to scale", by allowing *non-proportional* changes in the various production factors. Under this assumption an increase in the total input into a component will increase the component's chance of choosing a more efficient production factor mix. For instance, the component may increase the proportions of *material* and *premises* and decrease the *manpower,* to take advantage of greater mechanization.

The above analysis has been concerned with a given total input into the system. If instead, we consider total output as given, the conclusion regarding efficiency will be the same.

b) If CC carries out the activity, execution may be simultaneous on behalf of all RCs. This depends on the way the output quantity is defined. Since we are interested in the output of the system as a whole, the definition of CC's output must take into account whether or not CC's activity is a substitute for execution by several individual RCs (at a lower degree of activity transference). CC's "individual" output has to be multiplied by the number of RCs, to arrive at the output of the system as a whole. Examples of such activities are *sales promotion* and *choice of suppliers* in the subactivities *sending of advertising message* and *supplier negotiations* respectively. When CC sends an advertising message referring to all RCs, the size of the output must be considered the same as if each RC had sent a similar message independently. In cases of such "common" activities, efficiency will be greater at higher activity

transference, since input into CC results in an output that is multiplied by the number of RCs.

The System's Bargaining Strength

Under this heading the efficiency criterion is: the efficiency of the system as a whole in acquiring goods or resources. (A3b, B1).

The greater the activity transference for activities directly concerned with the acquisition of goods, production factors or capital, the greater will be the part of the system's acquisition of goods and resources that is controlled by CC. This follows from the relation between activity transference and decision integration (p. 71). On a "buyer's market" it will thus be more important for an external component to reach an agreement with CC at higher activity transference, since there is less opportunity for direct negotiations with individual RCs as an alternative to negotiations with CC. If negotiations with CC do not succeed, the effects on the seller will be more serious.

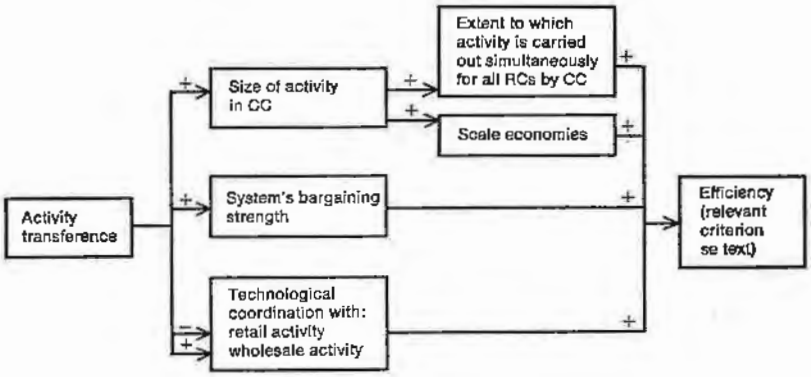
It can also be assumed that in comparison with the individual RCs, CC has greater financial resources at its disposal and more experience of the bargaining process. These factors are assumed to affect the bargaining strength favorably, not only on a "buyer's market" but also on a "seller's market". Thus CC will be in a position to offer better credit guarantees or other sales conditions than those available to buyers with more modest resources. Also, CC's greater experience is assumed to make for greater skill in negotiations.

I assume that its improved bargaining strength will be used by the system to gain more favorable prices, quantities or generally to improve its purchasing conditions. We can thus conclude that an increase in activity transference allows the system greater bargaining strength and, consequently, increases its efficiency.

Technological Coordination

In this subsection the criterion of efficiency refers to combinations of activities and combinations of components (A3a, B2). Technological coordination refers to interdependencies between activities, based on attributes of technical processes. Due to such interdependencies the efficiency of two activities may be affected by their mutual timing, their use of common production factor units, and the technique used in their execution. The degree of technological coordination of activities A and B is defined as higher, the less the improvement in A's efficiency that can be caused by any change in timing or technique in B, *and* vice versa. (Cf. coordination of decision processes, p. 27). I assume a higher degree of technological coordination, whenever the interdependent activities are executed in the same component.

Figure 9: 1 *Relations Between Activity Transference (Retail Activities) and Efficiency*



Thus if a retail activity A and an activity B are technologically interdependent, an increase in activity transference in A will mean lower technological coordination when B is a retail activity, and higher coordination when B is a wholesale activity. If we allow the activity transference of activity B to be greater than 0, this conclusion becomes invalid.

The problem of technological coordination, of course, becomes more complex if we introduce more than two technologically interdependent activities.

Effects of the Other EI Variables

The values of the other EI variables may influence the way in which a change in activity transference affects efficiency. This will be discussed below. I shall assume that these other variables remain at a certain level, apart from changes caused by the definitions (pp. 113 ff.). The effects of activity transference, when a change in another EI-variable is the subject of the analysis, will be discussed in other subsections.

Internalization. If internalization is higher in one case than another, then an increase in activity transference will mean that the part of the activity executed at CC will be larger. Thus, the greater the internalization, the more favorable the effect of an increase in activity transference.

Exclusiveness. The degree of exclusiveness affects the size of the activities in CC and RC. (This will be discussed below on p. 197.) Thus the scale economies resulting from an increase in activity transference are also affected. For example, greater exclusiveness in the *flows of goods to RCs* combined with an increase in activity transference, will mean an increase in the size of the retail activities at CC related to this type of flow. Greater exclusiveness in the *flows of goods from CC* combined with an increase in activity transference, on the other hand, may mean a smaller increase in the size of the

activity at CC.[2] However, this conclusion is not always valid (p. 197). Similar arguments can be put forward for the other flows and the size of the related activities.

The greater the exclusiveness of the flows of goods and resources to RCs, the greater the system's bargaining strength (acc. to p. 198 below). Thus a high degree of exclusiveness will reinforce the positive consequences of an increase in activity transference. But a high degree of exclusiveness can also be seen as a substitute for high activity transference. In other words, if exclusiveness is high, an increase in activity transference will not lead to as great an increase in bargaining strength as when exclusiveness is low (even if the level of bargaining strength is higher when exclusiveness is also high).

An increase in exclusiveness means an increase in the interdependence between activities executed by different components in the system (pp. 30 f.). Thus the positive or negative effects of activity transference on efficiency resulting from technological interdependence will be greater, the higher the degree of exclusiveness.

Homogeneity. If homogeneity is greater the scale economies of an increase in activity transference will be greater. This is because the execution process at CC will have to handle fewer deviations from an average routine. Greater homogeneity also means that certain activities (e.g. *sales promotion* and *choice of suppliers*) can to a greater extent be carried out simultaneously for several RCs.

If homogeneity is greater, the effects of an increase in activity transference between wholesale and retail activities resulting from technological interdependence will be more positive.[3] This is because there can be more uniformity in the way the wholesale activity is carried out.

[2] An example from the empirical study: the existence of a large external buyer meant that the distribution of perishables from CC was on sufficiently large a scale to justify the use of modern equipment, with high efficiency in the *prepackaging* and *price marking* activities as a result.

[3] Homogeneity in the time dimension of some retail activities constitutes an exception to this. An example: increased activity transference in *goods receival* will lead to less efficiency due to the technological interdependence between this activity and the wholesale activity *out transport*, if the system's RCs are highly homogeneous in their timing of *goods receival* than if they are very heterogeneous.

Internalization[4]

The main intervening variables in this section will be: *size of the activity, price/cost ratio, technological coordination,* and *control.*[5]

Size of the Activity

The efficiency criterion here is the efficiency of the individual activity in the system as a whole (A4, B1). The price paid by the internal component to the external components for carrying out the activity is included in input as a cost. In this subsection the price is assumed to be the same as the cost of carrying out the activity in the external components.[6]

I assume that either the total input into the activity or the total output from the activity is given. Total output *or* input can then vary, but only within the limits allowed by the efficiency effects of different degrees of internalization.

The higher the degree of internalization the higher, by definition, is the proportion of the activity that will be executed inside the system. However, the absolute size of the activity in the external component is also affected by the flow relations between this component and others outside the system. This means that even if internalization is very high, the absolute size of the activity in the external component can be considerably greater than in the internal components. Thus a change in internalization can affect the absolute sizes of the activity in internal and external components so as to increase or decrease efficiency, according to the above analysis of activity transference and scale economies.

Price/Cost Ratio

When an activity is executed externally, the price the system has to pay for it may be greater or less than the cost borne by the external component. The efficiency criterion in this subsection is the same as above (i.e. A4, B1) except that here the cost of the external component does not necessarily agree with the costs accruing to (i.e. the price paid by) the internal component.

[4] I shall not discuss changes in internalization that depend solely on increases or decreases in the size of activities in external components, unless such changes affect the size of the internal execution of an activity.

[5] Compare this choice with the following:

Size of the activity. Relation 6, p. 145, and references in the section on activity transference.

Price/cost ratio. Relation 13, p. 149, relation 3 in schedule A 9: 1, Berg & Bernitz (1966, p. 110), Bain (1959, pp. 155 ff.).

Technological coordination. References in the section on activity transference.

Control. Relation 13, p. 149, Carlson & Kusoffsky (1966, appendix II), Thorngren (1967).

[6] I acknowledge, of course, the difficulties inherent in allocating to individual activities a price that concerns several activities. As I have stated before it is outside the scope of this study to discuss the general problems of cost and revenue allocation.

I have introduced the concept of the *price/cost ratio* to indicate the relation between the price the system pays and the costs borne by the acting internal and external components. In internal execution the price and the cost are defined as equal, although there is no "price" in the usual sense.

If the cost of external execution is the same as the cost of internal execution and the price/cost ratio is greater than 1, then an increase in internalization will mean greater efficiency. If we assume lower costs in external execution and a price/cost ratio greater than 1, an increase in internalization may or may not lead to higher efficiency. Etc.

I assume that the greater the system's bargaining strength, the lower will be the price/cost ratio. Thus, at greater bargaining strength, a decrease in internalization will lead to a higher efficiency level.[7] An example of this is *"function transfer"* between distributor and supplier, whereby the supplier, without covering his costs by increasing the price, carries out activities previously executed internally (e.g. *price marking, positioning of goods/refilling of shelves*).[8] Although "function transfer" leads to greater efficiency in terms of *price/cost ratio,* the effect may well be the opposite in terms of *control* (see below).

Technological Coordination

The efficiency criterion refers to combinations of activities in the system as a whole (A3a, B1). The price of external execution is assumed to be equal to the costs. I am concerned with three types of activities. *A* is the activity for which internalization varies. *E* is an externally executed activity, and *I* an internally executed activity. Both *A* and *I* can be either retail or wholesale activities. It is assumed that *A, E* and *A, I* are interdependent on technological grounds. Coordination between *A* and *E* will thus be higher if the external component also carries out A (p. 190). A similar assumption applies to coordination between *A* and *I* if the internal component carries out both activities.

Thus an increase in the internalization of activity *A* will have a positive effect on efficiency, since the technological coordination between *A* and *I* will improve; on the other hand it also has a negative effect (but only to the extent that the price paid by the system for external execution is affected), since coordination between *A* and *E* will deteriorate.

Control

Since the concept of decision integration has been defined only for internal

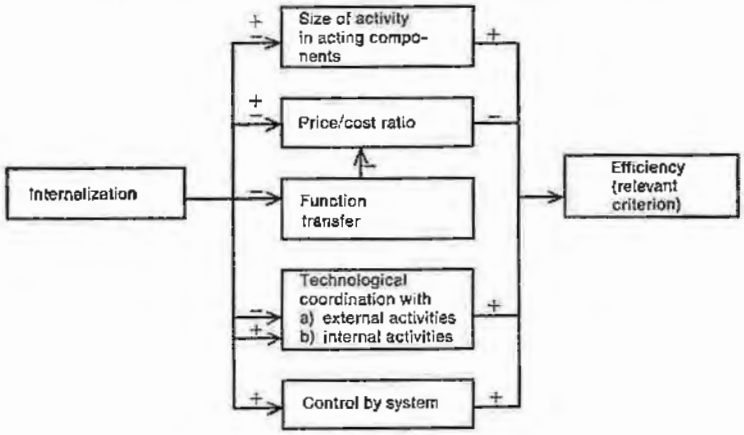
[7] In the long run, of course, the failure of an external component to cover its costs may have negative effects on the system. These effects will be ignored here as lying outside the scope of the study (p. 33).

[8] The concept "function transfer" (in Swedish "prestationsöverföring") was used first by Berg in, for instance, Berg & Bernitz (1966, p. 110). The concept has been further analysed in Valdelin & Öström (1966).

decision processes, I shall here use the more general concept of control (p. 58). I am here interested only in the *system's* control of activities; I am not interested in whether, or to what extent, certain components in the system exercise this control. The efficiency criterion here refers to the individual activity in the system as a whole (A4, B1).

It is assumed that the system has less control over activities executed by external components than over those executed by internal components. If the external component performs a commission for the system on exact specifications, the system's control over the activity will be the same as if execution were internal. I assume that greater control means less deviation between the goal adopted for the activity by the acting component and the system's goal. According to these assumptions, an increase in internalization will improve efficiency.

Figure 9: 2 *Relations Between Internalization and Efficiency*



Effects of the Other EI Variables

Activity Transference. The size of the activity per component, at a change in internalization, is dependent on the value of activity transference. High activity transference will mean that the effects on scale economies of an increase in internalization become less negative or more positive, since a greater part of the internalized activity is concentrated to CC.

The effect of internalization on coordination with internally executed activities will depend on the value of activity transference in all the interdependent activities. If, for example, internalization increases in retail activity *A*, and activity transference is low for both *A* and its technologically interdependent retail activity *I*, then the effect on efficiency due to better coordination will be more positive than if activity transference is high in either *A or I*.

Exclusiveness. At an increase in internalization, the size of the wholesale

activities in CC will be greater, the greater the exclusiveness of the *flows to or from CC.* This is because the measure of internalization refers only to that part of a wholesale activity that is indirectly related to flows between the system's RCs and the consumers (p. 105). The greater the exclusiveness of the *flows to or from RCs,* the greater the effect of a certain change in internalization on the size of related retail activities carried out by CC (i.e. in cases of activity transference greater than 0).

The system's bargaining strength is greater if the exclusiveness of the *flows to or from RCs* is greater. (This is discussed below, p. 198.) Thus, given a decrease in internalization, greater exclusiveness will reduce the price/cost ratio.

The greater the exclusiveness, the greater the interdependence between activities within the system. At greater exclusiveness, therefore, an increase in internalization will have more favorable effects on efficiency via technological coordination between internal activities.

Thus we can conclude that at greater exclusiveness a change in internalization will have greater effects—positive or negative—on efficiency.

Homogeneity. It is assumed that external components will be more willing to accept "a function transfer" if homogeneity is high in the activity, since its execution will then cost less. The reasons behind this statement have already been given in connection with homogeneity and activity transference, p. 192. The effects on efficiency of changes in activity size will, for the same reasons, also be affected by the degree of homogeneity.

Exclusiveness

The main intervening variables here are: *size of activity at CC, system's bargaining strength, coordination, number of flow relations between system and suppliers, number of transactions between system and suppliers, RC's adaptation to special conditions.*[9]

Size of Activity at CC

Here the efficiency criterion refers to the individual activity in an individual component, CC (A4, B3). Most of our definitions of the output of an activity

[9] Compare this choice with the following:

Size of the activity at CC. Relation 6, p. 145.

System's bargaining strength. Relation 15, 16 in appendix 9: 1.

Coordination. Relations 1, 2, pp. 142 f.

Cf. also, for relation between the three intervening variables above and efficiency the comparable references on p. 188.

No. of flow relations between system and suppliers. No. of transactions between system

have been related to a flow quantity (p. 21 and appendix 2: 1). Since input is not independent of output, the size of the input will be affected by certain flow quantities and, consequently, by the degree of exclusiveness. It is assumed below that *total* flow quantities to and from RCs are unchanged.

An increase in the exclusiveness of the *flows to or from RCs* will increase the size of the CC-executed activities related to the respective flows. This applies to wholesale activities (and to retail activities if activity transference is greater than 0). If, for example, the exclusiveness of the goods flow to RCs increases, the total goods flow to and from CC will also increase, as will the size of the CC-executed activities related directly or indirectly to the goods flows.

An increase in the exclusiveness of the *flows to or from CC,* will lead either to an increase or to a decrease in the size of the CC-executed activities related to the respective flows. There will be an increase in size, if the increase in exclusiveness depends on an increase in the flow quantity from or to RCs. If, for example, RC starts to buy a greater proportion of its total purchases from CC, then the total goods flow from CC will grow; so will the activities in CC connected with this flow. If, on the other hand, the increase in exclusiveness depends on a decrease in the flow quantity to or from external components (buyers etc.), then the total flow to or from CC will also decrease. If, for example, CC sells less to external buyers while sales to RCs remain the same, then the size of CC's goods handling activities etc. will decrease.

Changes in the size of the activity at CC, depending on changes in exclusiveness, can affect the efficiency of the activity in the following ways:

First there are scale economies according to our analysis of activity transference (p. 189).

Secondly, if the change in exclusiveness has also, by definition, brought about a change in internalization, the effects of this must be taken into account (pp. 193 ff.).

Thirdly, if there is an increase in exclusiveness, the total quantity of flows between RCs and external components will decrease. I assume that wholesale activities will in such cases sometimes, but not always, be carried out *both* by an external component and by CC, to maintain a certain flow quantity to or from RCs. This increase in the size of the activity at CC will tend to reduce

and suppliers. In analyses of marketing costs the customer, supplier or transaction is often regarded as cost-affecting units. See e.g. af Trolle (1963, ch. 8). Current explanations of the existence of intermediaries ("assortment and allocation function") include assumptions about relations between number of flow relations and costs and/or number of transactions and costs. See e.g. Alderson (1957, ch. 7), Artle & Berglund (1959). The analysis in Balderston (1958) of communication networks in intermediate markets and relation 4 (p. 144) are also relevant references.

RC's adaptation to individual conditions. Relation 16, p. 152.

efficiency. Note, however, the positive effects in this context of an increase in exclusiveness geared to number of flow relations and number of transactions (see below). It is also assumed that an increase in exclusiveness sometimes means that the external component is no longer involved in maintaining a certain flow to or from RCs, for example when CC takes over delivery to the stores from an external wholesaler.

The System's Bargaining Strength

Here the efficiency criterion refers to the acquisition of goods or resources for the whole system (A3b, B1). The degree of exclusiveness affects the system's bargaining strength in acquiring goods and resources (excluding manpower) in three ways. To begin with, bargaining strength increases with an increase in the exclusiveness of the flows to RCs. The reasons for this are the same as have already been mentioned in connection with activity transference (p. 190).

Secondly, on a "buyer's market", bargaining strength increases with an increase in the *total* quantity of goods flows and production factor flows to CC. This statement is based on the following reasoning. I assume that a supplier of goods or production factors attaches greater economic importance to keeping or getting a buyer, the greater his total purchase quantity, regardless of whom he buys from during the present period. The buyer's potential purchase volume from the supplier is greater. I assume that the total flow of goods to CC is equal to the flow from CC. I also assume that the flow of production factors to CC increases, if there is an increase in the equivalent flow from CC. The relation between total flow quantity from CC and exclusiveness was analysed above. Thus, bargaining strength increases when the exclusiveness of the goods flows to RCs increases, and increases or decreases when the exclusiveness of the goods flows from CC increases.

Thirdly, bargaining strength increases with an increase in the quantity per flow relation between CC and the external suppliers. I assume that a larger total flow to CC means that the quantity per flow relation between CC and external suppliers has also increased. The system will then enjoy greater bargaining strength on a "buyer's market" because a drop in purchases or the complete loss of a big customer will hurt more and a certain relative increase in the purchases will have a greater absolute effect. The greater the quantity per flow relation is also assumed to have the effect of making the system more dependent on its existing suppliers. This will tend to lower the system's bargaining strength on a "seller's market".

We can thus conclude that, with some exceptions, an increase in exclusiveness leads to an increase in efficiency resulting from an improvement in bargaining strength.

Coordination

In this section I no longer restrict myself to technological coordination. Instead I use the term coordination as discussed on pp. 27 f. The most important effect that exclusiveness has on coordination efficiency (A3a, B2, C3) has been discussed earlier in connection with decision integration and efficiency (p. 132 and p. 183). However, even if we ignore its effects in that respect, the degree of exclusiveness affects coordination efficiency. Interdependence between components in the system, and consequently the need for coordination, increases with an increase in exclusiveness. Not only this but also the opportunities for achieving a higher degree of coordination improve. An increase in exclusiveness will mean an improvement in the quantity and quality of the information in CC about RCs' activities, both before and after execution. This information will increase the quantity and quality of information in CC's decision base for its own activities. For example, if the exclusiveness of goods flow to RCs is greater, CC can make better predictions of purchase quantities from RCs, thus improving conditions for its own *ordering* activity.

It is not possible to state here whether the net result of an increase in exclusiveness will be lower coordination efficiency due to the greater need for coordination, or higher coordination efficiency due to improved opportunities for achieving a higher degree of coordination.

Number of Flow Relations Between System and Suppliers

Under this heading efficiency refers either to the individual activity or to the acquisition of goods and resources, in both cases for the whole system (A4, B1 and A3b, B1). I assume that the mere existence of a flow relation generates some costs that are independent of the quantity of the flow. I further assume that, regardless of variations in the system's bargaining strength, external suppliers of goods and resources will offer lower prices, decreasing at a constant rate, when the flow quantity per period increases. If we assume that the total flow quantity to or from CC is given, and that no external component has flow relations with *both* CC and RCs for the same type of flow in the same period, then an increase in the exclusiveness of flows to or from RCs will decrease the number of flow relations between RCs and the environment and/or decrease the quantity per such relation. In both cases CC's corresponding external flow relations will increase in number and/or increase in quantity per relation. As there is only one CC in the system, the net effect will be a decrease in the total number of flow relations between system and suppliers and an increase in the average quantity per relation.

We can thus conclude that an increase in exclusiveness will lead to an increase in efficiency.

Number of Transactions Between System and Suppliers

Efficiency criteria are the same as above (i.e. A4, B1 and A3b, B1). Each transaction, regardless of size, is assumed to incur certain costs. Suppliers are assumed to offer lower prices (decreasing at a constant rate) for larger transactions, regardless of the system's bargaining strength. I assume as above that the total flow quantity to or from RCs is given; changes in exclusiveness thus refer to changes in the proportion of external to internal flow quantities. I further assume that the number of transactions per flow relation is independent of the flow quantity per period.[10]

An increase in exclusiveness means fewer flow relations between system and suppliers (see above). This in turn means fewer transactions between system and environment but a larger average transaction size. According to the above assumptions, the number of transactions between CC and RCs remains unchanged; thus there is also an increase in the size of transactions in internal flows.

The conclusion is that an increase in the exclusiveness of the flows to or from RCs, leads to an increase in efficiency.

RC's Adaptation to Special Conditions

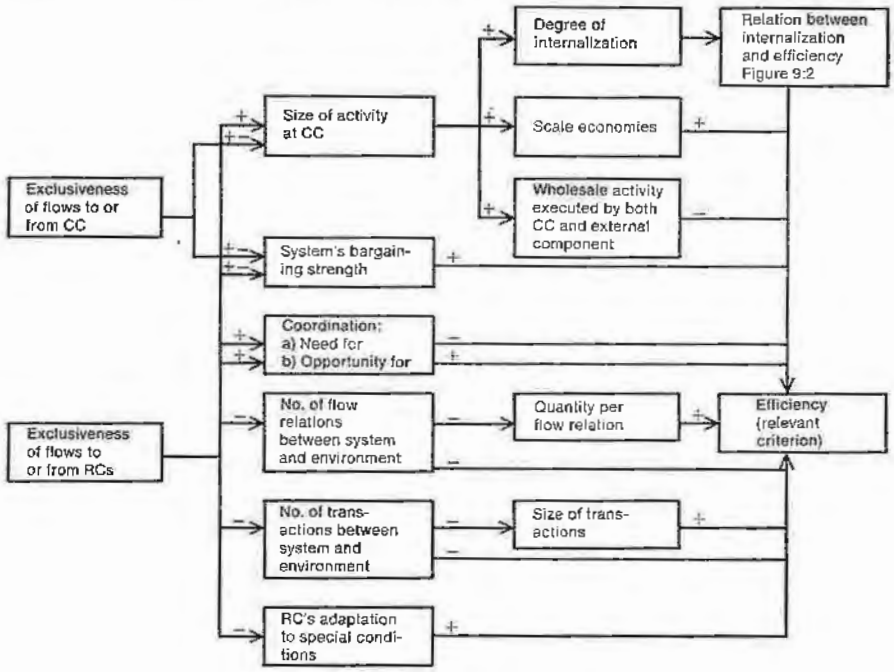
Under this heading efficiency refers to the individual activity in the individual component (A4, B3). Given greater exclusiveness in the flows to or from RCs, RC will find that, for some activities, the number of alternatives available will be somewhat restricted. For example, if the exclusiveness of the goods flow to RCs is very high, then most of RC's assortment must be selected from items included in CC's assortment. If the flow of manpower to the system's components is very exclusive, people from outside the system can very rarely be recruited as managers.

This means that any RC which differs considerably, or whose environment differs from what is usual in the system, may have to choose an alternative not well suited to its special conditions. For example, if competition and market conditions differ markedly for any particular RC from the average in the system, RC may find that system-imposed restrictions on its *choice of assortment, choice of suppliers* and *sales promotion* hamper a proper adjustment to local conditions.

The relations between exclusiveness and efficiency are summarized in figure 9:3.

[10] This assumption can be compared with the conditions in real systems operating with a fixed number of deliveries per period; within broad limits this number is unaffected by the flow quantity per period.

Figure 9: 3 *Relations Between Exclusiveness and Efficiency*



Effects of the Other EI Variables

Activity Transference. The greater the activity transference of a retail activity, the greater the increase in the size of this activity at CC, given a certain increase in the exclusiveness of the flows to or from RCs. If activities involving negotiations with external suppliers enjoy higher activity transference, an increase in the exclusiveness of the flows to RCs will lead to greater bargaining strength.

Internalization. The positive or negative effects on efficiency of a change in exclusiveness will generally be greater, the greater the internalization of the activities concerned.

Homogeneity. The greater the homogeneity of retail activities, the more positive will be the effects of increases in activity size at CC (wholesale or retail activity) following a change in exclusiveness (see p. 192; also p. 203 below). The greater the homogeneity of activities such as *choice of assortment, choice of suppliers, acquisition of material* etc., the fewer will be the flow relations and the fewer the transactions between system and suppliers at an increase in the exclusiveness of the flows to RCs. Since there will also be a greater increase in quantity per flow relation with the environment in such cases, bargaining strength will increase.

Homogeneity[11]

The main intervening variables here are: *number of flow relations between CC and suppliers, coordination between wholesale and retail activities,* and *RC's adaptation to special conditions.*[12]

Note that the effect of the homogeneity variable on the way that changes in other EI variables affect efficiency has been discussed above in the sections on activity transference, internalization and exclusiveness. An example is the effect of homogeneity on scale economies resulting from an increase in activity transference.

Number of Flow Relations Between CC and Suppliers

Efficiency here refers either to the individual activity in CC or to the acquisition of goods and resources for the whole system (A4, B3 or A3b, B1). Note that in the first case efficiency refers to a wholesale activity and homogeneity to a retail activity. It is assumed that the number of external components with which CC has flow relations depends on the degree to which the flows between CC and each RC vary in their composition. If they are fairly uniform, it can be assumed that fewer external components (and thus fewer flow relations) will be needed to satisfy CC's need to create flows of a certain size between itself and RCs. The uniformity of the flows will be dependent on the degree of homogeneity in certain dimensions of certain activities related to the flows. For example, if there is an increase in the homogeneity of the retail activity *choice of assortment,* dimension *article identity,* then the flows of goods from CC to each RC will be more uniform in their composition and, accordingly, CC will have flow relations (goods, information and payments) with fewer external suppliers.

Thus, at a given total flow to or from CC the greater the homogeneity in relevant dimensions of certain activities related to the various flows, the fewer the flow relations between CC and the environment and the greater the flow quantity per such relation to or from CC. If flow relations become fewer and larger, this will lead to increases in efficiency with regard to both criteria (according to the earlier analysis p. 199).

Coordination Between Wholesale and Retail Activities

The efficiency criterion concerns a combination of a wholesale and a retail

[11] Homogeneity refers here to retail activities only.

[12] Compare this choice with the following:

Number of flow relations between CC and suppliers. Relations 13, p. 149, and 1, 6, 17 in appendix 9: 1.

Coordination between wholesale and retail activities. Relations 1, 2, 4, pp. 142 ff. and 2, 4, 12 in appendix 9: 1.

RC's adaptation to special conditions. Relations 15, p. 151; 5, 10 in appendix 9: 1; Balderston (1962).

activity for the whole system, in the first three cases with regard to the execution process, and in the fourth case with regard to coordination efficiency. (i.e. A3a, B1, C2b and A3a, B1, C2a) (For the sake of simplicity I will assume below that the efficiency of the retail activity is not affected.)

First, if homogeneity is high in the *technique* dimension of a retail activity, then techniques can be chosen for the technologically interdependent wholesale activities without worrying about variations and exceptions from the normal routine. If homogeneity in the retail activity is low, then it is not possible for CC to carry out the whole activity in the most efficient way technologically speaking; furthermore each separate procedure will be on a smaller scale. In both cases the effects on the efficiency of the wholesale activity will be negative. On the other hand, high homogeneity may mean that CC has to choose a less efficient technique for a great part of the wholesale activity.

An example: Assume that RC can choose between three technical procedures and any combination of them for transferring order information: preprinted order form, visit to CC's warehouse, and sales visit from CC representatives. These retail techniques have their equivalent in different procedures in the wholesale activity *selling/order receival,* all to some extent requiring specialized resources. If all the RCs use preprinted order forms only, then CC can suspend his operations with regard to sales visits and receival of orders at the warehouse. CC's wholesale activity can then be run more efficiently because some resources are freed, and the technique chosen for *selling/order receival* may be the most efficient. If, on the other hand, all the RCs use the sales visit technique only, and if we assume that this is the least efficient technique from the point of view of the wholesale activity, then efficiency might be lower.

Secondly, an increase in homogeneity in the time dimension of a retail activity whose execution is closely related, time-wise, to certain wholesale activities, will mean greater variations in the work load in the wholesale activities.

An example: If goods supplied by CC are received by a large proportion of the RCs within a narrow time interval, then CC will need larger resources for *order picking* and *out transport,* because capacity has to be dimensioned for peak loads.

Thirdly, let us consider the effects of homogeneity on the coordination between CC's *storing* and RC's *choice of assortment* activities. Goods units included in the goods flow to CC are stored for varying lengths of time at CC. Assuming a given total flow quantity to and from CC, and given out-of-stock frequency, the average inventory size can be kept lower, the fewer the articles in CC's assortment. (This follows from elementary inventory theory.) If the number of articles supplied by CC in RC's assortment is given, then the number of articles that CC has to carry in its assortment will be lower, the higher the homogeneity in RC's *choice of assortment* (*article*

identity). Thus, if we assume that, other things being equal, efficiency in *storing* is higher, the lower the average inventory size, then efficiency will increase with an increase in the homogeneity of the retail activity.

Fourthly, an increase in the homogeneity of a retail activity will, at given information processing costs, improve the quality of the information in CC about individual RC behavior and, consequently, improve CC's decision base for any wholesale activities that are interdependent with the retail activity. This will increase coordination efficiency. (Cf. the analysis in sampling theory of the relation between the dispersion of the relevant variable within the population and the choice of sample size. See e.g. Ferber & Verdoorn, 1962, ch. 5.)

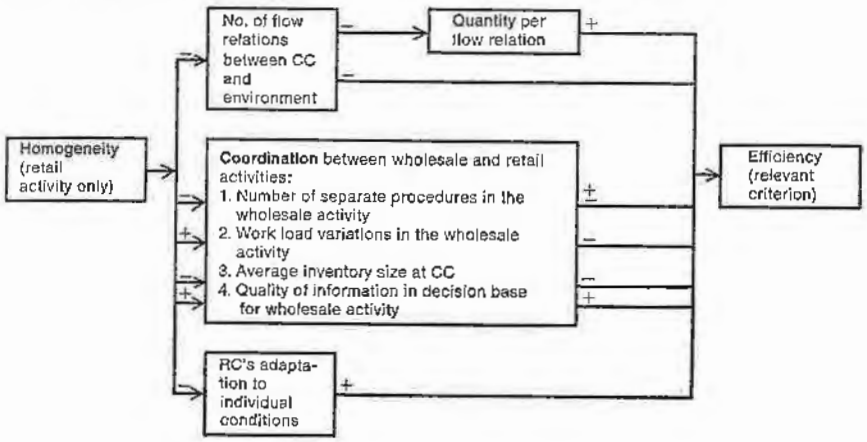
RC's Adaptation to Special Conditions

Here the efficiency criterion refers, in the first paragraph, to individual activities in individual components (A4, B3) and in the second paragraph to a combination of activities in the whole system (A3a, B1).

The higher the homogeneity in a retail activity, the less opportunity an RC has to choose an action alternative well adapted to its own special circumstances (such as its resource structure, or the conditions on its local market).

The efficiency consequences of an increase in the homogeneity of activity A will be affected negatively if the homogeneity in an interdependent retail activity B is low rather than high. For example, if homogeneity is low in *choice of assortment* or *pricing*, the effect of an increase in the homogeneity of *sales promotion* will not be equally favorable. The lower individual adaptability following an increase in homogeneity, will in such cases have more serious effects.

Figure 9: 4 *Relations Between Homogeneity and Efficiency*



Effects of the Other EI Variables

Activity Transference. An increase in the homogeneity (time dimension) of retail activities that are interdependent in time with wholesale activities will mean a greater increase in work load variations in CC, if activity transference is also high. The retail activity will also be using CC's resources during peak periods. An example: CC carries out a greater part of the *goods receival* or *positioning/refilling* following *out transport*.

If activity transference is high, the information in CC about the execution of the retail activity will be of a high quality (according to earlier assumptions p. 178). When activity transference is high, an increase in homogeneity does not therefore add to the quality of the information contained in the decision base for wholesale activities as regards the part of the activity that is carried out by CC.

Internalization. Given greater internalization in wholesale activities, the effects on coordination of a change in homogeneity will be more marked, because the size of the wholesale activities will be greater in CC.

Exclusiveness. The higher the degree of exclusiveness, the greater the interdependence in the system and the greater the effect, positive or negative, on efficiency of a change in homogeneity.

On the Effect of Environmental Variables on the Analysis

Schedule 9: 1 provides a list of the environmental variables discussed below, together with the EI-variables to which I assume they are relevant. Their connection with the marketing literature, as reported in chapter 7, is also indicated.

Activity Transference

The values of the following environmental variables will affect the way in which changes in activity transference will influence efficiency.

Technology is relevant because it affects the available combinations of production factors and their productivity, e.g. the existence of machines having particular performance characteristics, or the existence of possible technological solutions to the activity's execution. Technology affects efficiency via scale economies and the coordination of activities.

The *relative prices of production factors* will influence the way in which changes in the proportion of the various production factors affect efficiency and, thereby, the scale economies (p. 189).

The degree to which the system's acquisition market (for goods or resources) can be characterized as a "buyer's market". An increase in this variable will increase the efficiency improvement resulting from the relationship between activity transference and the system's bargaining strength (p. 190).

Schedule 9: 1 *List of Environmental Variables*

Environmental Variable	Relevant to EI Variables:[13]	Cf. according to schedule 7: 6, pp. 153 f. relation no.: environm. variable no.
Technology	A, I, E, H	3: E3, 4: E4, 12: E1
Relative prices of production factors	A, I, E, H	3: E4
The degree to which the system's acquisition market can be characterized as a "buyer's market"	A, I, E, H	
Legal regulations	A, I, E, H	4: E1, E2, 11: E1
Size of a particular retail activity in an external component	I	
General price level of a particular externally executed activity	I	5: E2
Seller's general differentiation of sales conditions between buyers according to purchase volume (regardless of buyer's bargaining strength)	E, H	5: E4
Homogeneity of consumer preferences between submarkets	E, H	1: E4
Homogeneity of competitor behavior between submarkets	E, H	

Legal regulations regarding competition, bank loan provisions, town planning, etc., can affect the consequences of activity transference with regard to the utilization of bargaining strength, and the realization of potential economies of scale or the economies of improvements in the technological coordination of activities.

Internalization

Technology, the relative prices of production factors, and *legal regulations* will have the same type of effect on the relation between EI and efficiency, as regards scale economies and coordination. The reasons for this are the same as under the previous heading.

The effect on efficiency via the price/cost ratio will be affected by *legal regulations* and by the *"degree of buyer's market"*. The price/cost ratio is assumed to decrease when the latter variable increases.

Under the present heading it is also relevant to consider: *the size of a particular retail activity in an external component* and the *general price level of a particular externally executed activity*. The higher the value of the first of these variables, the more positive will be the effect on efficiency of a decrease in internalization. An increase in the *general price level of a particular externally executed activity* will increase the price/cost ratio and make an increase in internalization more favorable.

[13] A = Activity transference, I = Internalization, E = Exclusiveness, H = Homogeneity.

Exclusiveness

Arguments similar to those in the subsection on activity transference above apply with regard to the effect of *technology, the relative prices of production factors, "degree of buyer's market"*, and *legal regulations,* on the consequences of a change in the degree of exclusiveness. (The relevant main intervening variables are size of the activity at CC, system's bargaining strength and coordination.) The effects on efficiency of changes in number of flow relations and number of transactions are affected by *technology* and by *seller's general differentiation of sales conditions* between buyers according to purchase volume. An increase in the latter variable will have a positive effect on efficiency.

The greater the *homogeneity of consumer preferences between submarkets* and of *competitor behavior between submarkets,* the less will be the negative effect on efficiency of an increase in exclusiveness with regard to RC's adaptation to special conditions.

Homogeneity

All environmental variables relevant to this EI-variable have been introduced in the subsections above. The three main intervening variables in the analysis of homogeneity have their counterparts in analyses of the other EI variables. I need therefore only refer to schedule 9:1, where the relevant external variables for homogeneity are listed, and to those paragraphs above where number of flow relations, coordination and RC's adaptation to special conditions are treated.

On the Effects During the Changeover Period

Hitherto our analysis has been concerned with a comparison between situations with different levels of integration (p. 159). We must now briefly consider the effects on efficiency of the changeover period itself.

I have previously assumed that a decrease in an integration variable will have the opposite effects to an increase. This assumption does not apply in the present section. The *change* as such is instead assumed to have the same types of effect regardless of whether it constitutes a decrease or an increase.

A change in execution integration takes time to establish. If efficiency is a monotonously rising—or falling—function of execution integration, then average efficiency will be lower—or higher—during the period of change than it will be afterwards.

It also takes time to realize the adjustments in resources, flows and activities that are the purpose of the change in integration. Consider, for example, a change in activity transference: new tasks will have to be learnt, and production factors reorganized to deal with them. Or, to take another example,

suppose that the system tries to increase the exclusiveness of the goods flows to RCs. External components may well try to counteract this by stepping up their sales efforts towards RC, so that there is no reduction in the number of external flow relations in the early part of the changeover period. Thus, to begin with, any increase in exclusiveness, in this case, depends only on a reduction in the quantity per flow relation between RC and external components.

We can also assume that a change in decision integration is sometimes used as a method of changing execution integration. This approach leads to higher costs during the period of the changeover; it also takes time to change DI (p. 186).

Thus we can conclude that, if a particular change (increase or decrease) in execution integration does lead to an increase in efficiency, efficiency during the period of the changeover will nonetheless be below the level it subsequently reaches; possibly even below its level before the change. If a change in execution integration results in a loss of efficiency, efficiency during the period of the change may be above or below its subsequent level.

On the Effects of Decision Integration and Institutional Integration[14]

One of the purposes of maintaining *decision integration* at a high level, or of increasing it, may be to cause changes—particularly increases—in EI variables (p. 132). If DI is initially high, the changeover period will be shorter and the cost of raising DI will be avoided (p. 186). Thus efficiency during the changeover period is higher, at a given change in execution integration, if DI is initially high.

High DI can in some cases be regarded as a substitute for high EI values. Some examples: bargaining strength in the system can be improved either by an increase in DI or by an increase in exclusiveness or activity transference. Coordination between wholesale and retail activities can in some cases be improved by an increase in DI or by an increase in some EI variable.

If an EI variable is reduced, in order to achieve certain positive effects, high DI will help to soften some of the less favorable effects of such a change. For example, if there is a decrease in the exclusiveness of the goods flow to RCs, any negative effects on bargaining strength can be modified, or avoided altogether, if the retail activity *choice of assortment* exhibits high DI.

Institutional integration (II) affects the analysis of EI and efficiency directly and also, indirectly, via the relation between II and DI.

[14] Note that the effects of the EI variables on the analysis of DI and efficiency have been discussed above pp. 181 ff. Efficiency criteria in this section refer to both decision and execution processes, i.e. they refer to the C1-level, because decision integration is included in the analysis.

According to our analysis in chapter 8, the higher the degree of institutional integration, the higher the efficiency at a given increase in decision integration (p. 184). Thus, because of the relation between DI and EI referred to above, the effects on efficiency of a change in EI will also be indirectly affected by II.

It has been pointed out above that institutional relations may involve the existence of mandatory rules specifying that CC, rather than RC, should carry out certain activities (p. 128). In some cases these rules guarantee high exclusiveness and high activity transference. Institutional relations can also contain rules which are not legally binding but which, *if followed,* will affect the values of certain EI variables (p. 129). It can be assumed that the existence of institutional relations of both these types will facilitate increases in EI, or the maintenance of EI at a high level. It can be further assumed that mandatory rules will have the greater effect.

We can conclude that the effects on efficiency of a change in execution integration will be more positive or less negative (particularly during the period of changeover), if institutional integration is high.

Chapter 10
Summary, Further Research, Possible Applications

Findings of the Study—a Summary

The findings of the study can be summarized under three subheadings: (a) the system of concepts, (b) measurements of integration variables in real systems, (c) the analysis of relations between integration and efficiency.

The System of Concepts

If we compare the system of concepts developed in chapters 4—6 above with the concepts of marketing literature as reported in chapter 3, we find that certain features emerge. (Cf. p. 45.)

a) *Emphasis is no longer mainly on institutional relations;* instead integration is related more directly to the decision and execution processes of the activities in the system.

b) The concepts are defined in such a way that the *integration variables* (excluding institutional integration) *are continuous,* i.e. integration in its various senses can assume any value between zero and one. The concepts quoted in chapter 3 treat "integration" as a discrete variable (sometimes only allowing for the values 1 and 0), and/or imply that it is continuous but do not indicate how to define it as such.

c) *The concepts can be operationalized.* Some sort of measurement has been made here for all the integration variables (excluding internalization). In the case of decision integration, I have shown that at least rankings and rough classifications are practicable.

d) The relations between the integration concepts have been analysed. It is possible to see them not as a set of disparate concepts but as a *system of interrelated concepts.*

Measurements of Integration Variables

Under this heading the main findings are:[1]

a) Comparisons *between systems* have shown that the degree of integration for one particular activity often *varies* from system to system.

b) Comparisons *between the activities in a particular system* have shown that the degree of integration often *varies* from one activity to another.

[1] (a)—(c) contain statements about decision and execution integration.

c) It has been shown that in a majority of cases the degree of integration is *neither extremely high nor extremely low.*

d) In our material, correlation has generally been high *between the rankings of different integration variables.*[2]

The reliability and validity of the measurements must be judged in light of (1) generally accepted models (theories) of the mode of operation of the measuring instruments applied, in this case interviews and questionnaires, and (2) the relation between the definitions at model level and the operationalizations.

The first of these questions concerns the transition between real systems and the description level. It is treated in the literature on research methods in behavioral sciences. My chief measurement technique has been the use of non-standardized interviews, whose results I have interpreted myself. Reliability and, probably to a lesser extent, validity will have suffered from this. As to point (2), one can pose the following question: does a particular operationalization really measure what we want to measure, in light of the definition of the concept at model level? This is a question of validity in the sense of the correspondence between model level and description level. Since these results are geared not to disparate concepts but to a system of concepts, and since the various results are compatible with the models of integration/efficiency relations developed in this study, there seems to be some grounds for claiming fairly high validity in this respect.[3] Note, however, that my analysis of integration/efficiency relations has to some exteut been affected by the present empirical study. This somewhat weakens my claim for validity.

Analysis of Relations Between Integration and Efficiency

The analyses in chapters 8 and 9 led me to certain *conclusions about relations between integration and efficiency.* These conclusions are based ou certain explicit assumptions and have been reached by deductive reasoning. The conclusions, and the reasoning and assumptions behind them, together form a coherent frame of reference. It should be possible to reformulate the conclusions into a system of hypotheses that may be subjected to soine sort of empirical test.[4] The conclusions are presented on pp. 213 ff.

Conclusions about the direction of the various relations do not give any indication of the direction of the net effect on efficiency of a particular integration change, because the analysis does not weigh the simultaneous

[2] Since the number of elements in each ranking, and the number of rankings, are both small, there is a more than negligible probability that these have occurred by chance even at relatively high correlation coefficients.

[3] Cf. the discussion of "conceptual validity" in Ramström (1967, pp. 30 f.).

[4] In formulating hypotheses, the greatest difficulty will probably be the operationalization of some of the variables included in the analyses of relations between decision integration and efficiency.

positive and negative effects against each other. In some cases it has not even been possible to state the direction of the relationship. The relative importance of the positive and negative effects is also affected by assumptions regarding other integration variables and environmental variables. In fact, a major feature of the analysis is that assumptions about *the values of the other integration variables are very important with regard to the effects on efficiency of a particular change in one integration variable.*

By the validity of the models (in chapters 8 and 9) I here mean the "agreement" between relations at model level and corresponding relations in the real systems. Subjective evaluations are the only ones possible here. We can ask ourselves three questions: (1) are the assumptions in the models "realistic" and do they agree or disagree with "known facts"? (2) is the deductive reasoning logically correct? (3) do the conclusions agree with or contradict generally accepted conceptions or knowledge about relations in real systems? The answers to these questions can provide a rough test of validity ("face validity" or "consistency") at this early stage in the development of the models (Amstutz, 1967, p. 381).

The analysis has been linked to empirical and theoretical studies in the subject area. This should affect validity positively with regard to (1) and (3). As to (2), it should be rather easy in most cases to judge the quality of the deductive reasoning.

However, my general assumptions suffer from certain basic limitations that affect the validity in a negative way. The following are probably the two most important:

a) The analysis concerns a comparison of two states of equilibrium; it therefore takes no account of the dynamic nature of the real systems. For instance, the analysis of the interrelations between integration variables in the efficiency analysis suffers from this.

b) The chosen limits of the system, for which efficiency has been analysed, exclude any consideration of the efficiency of external components, such as manufacturers and consumers. Thus I neglect the fact that actions leading to an increase in the efficiency of the system may lower the efficiency of certain components in the environment, which may ultimately have a negative effect also on the efficiency of the system (cf. p. 33). However, in many studies efficiency is viewed from the point of view of single components only; in comparison with such studies my system-oriented approach should represent some gain in validity.

A subjective evaluation on the above lines suggests a reasonable degree of validity for the models presented here, according to the limited concept of validity I have applied. More rigorous tests of validity would be possible only if the models were developed further. The problems of verification will be touched upon later in this chapter.

Conclusions of the Analysis of Decision Integration and Efficiency

The reader may find some of the conclusions below difficult to understand unless they are seen in the context of the analyses in chapters 8 and 9. Similarly, out of this context others might appear self-evident. There is a page reference at the end of each conclusion. To save space I have excluded conclusions regarding environmental variables.

1.[5] If there is an increase in decision integration, transfer costs will (a) rise because the number of messages in the system increases, (b) fall because the number of messages between the system and the environment decreases and (c) rise or fall because the distance for messages between system and environment, the frequency of messages per component pair, and the motivation of the retail component will increase or decrease (pp. 172 f.).
2. The greater the decision integration, the lower the costs of storing information (p. 173).
3. If there is an increase in decision integration, transformation costs will (a) decrease because the average size per decision step in the system decreases and (b) increase or decrease because the number of decision steps per component will decrease or increase (p. 173).
4.[6] The greater the decision integration, the greater the goal fulfilment (with regard to acquisition of goods or resources) because the system's bargaining strength increases (p. 175).
5. If there is an increase in decision integration, the level of goal fulfilment will increase or decrease because there is a decrease or an increase in the deviations between the goals of the decision maker and the system (p. 175).
6. The greater the decision integration, the greater the goal fulfilment because the logical consistency of the transformation activity improves (p. 175).
7. The greater the decision integration for retail activity A, the greater the coordination efficiency of A and wholesale activity W, which is interdependent with A (p. 179).
8. If there is an increase in decision integration for retail activity A, the coordination efficiency in a retail component of A and retail activity R, which is interdependent with A, will either increase or decrease (p. 179).
9. The greater the decision integration for a retail activity, which is carried out by all the system's retail components, the higher the coordination efficiency of this activity in the system (p. 180).
10. An increase in decision integration for activity A has more favorable effects on the efficiency of the decision process of A if the decision

[5] Conclusions 1—3 apply for a given level of goal fulfilment.

[6] Conclusions 4—6 apply for given decision process costs.

integration of other activities is high than if it is low. This positive effect is greater, the greater the interdependence between A and the other activities (p. 181).

11. The greater the activity transference, the greater the efficiency of the decision process, given an increase in decision integration (p. 182).
12. The greater the internalization, the greater the efficiency of the decision process, given an increase in decision integration (with the exception of those cases where external components carry out commisions on the central component's request, p. 183).
13. The higher the degree of exclusiveness, the greater the efficiency of the decision process, given an increase in decision integration (p. 183).
14. The higher the degree of homogeneity, the greater the efficiency of the decision process, given an increase in decision integration (p. 183).
15. The greater the institutional integration, the greater the efficiency of the decision process, given an increase in decision integration (p. 184).

Conclusions of the Analysis of Execution Integration and Efficiency[7]

Note the various assumptions on which the conclusions are based. Efficiency criteria, which are specified in chapter 9, are not mentioned here. Conclusions about environmental variables etc. are not included in the list (see instead pp. 205 ff.).

Conclusions regarding activity transference, 16—21

16. The greater the activity transference, the greater the size of the activity in the central component compared with each retail component and the greater the efficiency (p. 189).
17. The greater the activity transference for activities including negotiations with external suppliers, the greater the bargaining strength of the system and the greater the efficiency (p. 190).
18. The greater the activity transference for retail activity A, the less satisfactory will be the technological coordination with the technologically interdependent retail activity R and the more satisfactory with the technologically interdependent wholesale activity W. The net effect on efficiency cannot be generally stated (p. 191).
19. The greater the internalization, the greater the positive effect on efficiency (according to conclusion 16), given an increase in activity transference (p. 191).
20. The degree of exclusiveness affects the efficiency, given an increase in activity transference but a general direction cannot be stated (p. 192).
21. The greater the homogeneity, the more positive will be the effects on

[7] In this subsection activity transference and homogeneity always refer to retail activities only. In any conclusions containing two EI variables the same activity is intended. When one of the EI variables is exclusiveness, a particular flow and one of the activities related to the flow is intended.

efficiency (according to nos. 16 and 18), given an increase in activity transference (p. 192).

Conclusions regarding internalization, 22—27

22. If there is an increase in internalization, efficiency will be affected by the changes in the size of the activity in the internal and external components (p. 193).
23. If there is an increase in internalization, efficiency will be affected by changes in the price/cost ratio (p. 194).
24. If there is an increase in internalization, efficiency will be affected, positively or negatively, by changes in the conditions for technological coordination with internally and externally executed activities (p. 194).
25. The greater the internalization, the greater the system's control over the activity. Such a change affects efficiency positively (p. 195).
26. The greater the degree of activity transference, the more positive will be the effect on efficiency, given an increase in internalization, according to no. 22. The effect according to no. 24 will be negative or positive depending on which component in the system carries out the other activity (p. 195).
27. The greater the exclusiveness, the greater the effects—positive or negative —on efficiency (acc. to nos. 22—25), given an increase in internalization (p. 196).

Conclusions regarding exclusiveness, 28—37

28. If there is an increase in the exclusiveness of the flows to or from retail components, efficiency will (a) rise because the size of activities at the central component will be greater, (b) fall because activities at the central component and at external components will in some cases overlap, and (c) fall or rise according to nos. 22—25 because in some cases there will also by definition be an increase in internalization (pp. 197 f.).
29. If there is an increase in the exclusiveness of the flows to or from the central component, efficency will be affected because the size of the activities at the central component will either increase or decrease (p. 197).
30. The greater the exclusiveness of the flows of goods or resources to the retail components, the greater the system's bargaining strength on a "buyer's market" and the greater the efficiency in the acquisition of goods and resources (p. 198).
31. If there is an increase in exclusiveness, efficiency will be affected because there will be an increase in the need for coordination as well as in the opportunities of achieving it. The net effect on efficiency cannot be generally stated (p. 199).
32. The greater the exclusiveness of the flows to or from the retail components, the fewer the number of flow relations between the system's components and external suppliers, and the greater the efficiency (p. 199).

33. The greater the exclusiveness of the flows to or from the retail components, the fewer the transactions between system and suppliers, and the greater the efficiency (p. 200).
34. The greater the exclusiveness of the flows to or from the retail components, the less satisfactory the retail component's adaptation to special conditions and the lower the efficiency (p. 200).
35. The greater the activity transference, the greater the positive effects on efficiency according to nos. 28, 30, given an increase in the exclusiveness of the flows to or from the retail components (p. 201).
36. The greater the internalization, the greater the effects, positive or negative, on efficiency, given an increase in exclusiveness (p. 201).
37. The greater the homogeneity, the greater the efficiency according to nos. 28, 30, 32, 33, given an increase in the exclusiveness of the flows to or from the retail components (p. 201).

Conclusions regarding homogeneity, 38—44

38. The greater the homogeneity, the fewer the flow relations between the central component and the environment, and the higher the efficiency (p. 202).
39. If there is an increase in homogeneity, efficiency will be affected in both positive and negative directions with respect to the coordination between retail and wholesale activities (pp. 203 f.).
40. The greater the homogeneity, the less satisfactory the retail component's adaptation to special conditions, and the less the efficiency (p. 204).
41. If there is an increase in homogeneity for a particular activity A, the effects on efficiency will be more positive, the higher the homogeneity in other activities interdependent with A (p. 204).
42. The greater the activity transference, the more negative will be the effect on efficiency according to some aspects of no. 39, given an increase in the homogeneity of the time dimension of certain retail activities (p. 205).
43. The greater the internalization of wholesale activities, the greater the effects (positive or negative) on efficiency according to no. 39, given an increase in homogeneity (p. 205).
44. The greater the exclusiveness, the greater will be the effects (positive or negative) on efficiency according to nos. 38—41, given an increase in homogeneity (p. 205).

Some Comments on Further Research

In this section I am concerned to identify some research problems, and to discuss some approaches in light of the findings of this study. Assuming that the general goal of the scientific process is to increase the knowledge of particular real systems from particular points of view, it seems clear that two

parallel approaches will be needed: the construction and analysis of models, and empirical studies. We need models in order to design the empirical studies. We need empirical studies to elaborate and reconstruct the models. There must be interactions between studies at the model level and studies at the description level. In this context the following problems appear important:

a) The methods for *measuring* integration variables should be studied. In particular, attention should be paid to the relation between the definition at model level and its operationalization, since this is very important in connection with the validity of measurements. In this respect the concept of decision integration presents the greatest problems.

b) The models should be developed *quantitatively* so that contradictory relations could be weighed against each other; also that not only the direction but also the size of changes could be indicated, and that some sort of validity tests could be applied.

c) *Dynamic* models should be developed, so that changes in the attributes of the systems over several periods could be studied. This would be particularly interesting in light of the interrelatedness of the integration variables.

d) Empirical studies designed for the purpose of *verification* should be undertaken to see how far the models agree or disagree with conditions in the real systems.

However, I believe that studies of type (d) should wait until further work has been done on models and the operationalization of concepts. To think of testing hypotheses before we have reasonably well-developed models from which they can be derived and to which the result of the study can be related for further development of the models, seems to me premature. I therefore suggest that the empirical studies necessary for progress under (a)—(c) above should be geared to individual *cases* or comparisons between such cases. An example could be the description of systems in which the central component tries to change one or more integration variables in one or more activities. The choice of variables to include in such case studies could be based on the concepts and analysis developed here.

In studies for the purpose of verification, testing may be applied to single hypotheses, systems of hypotheses, or system models of varying degrees of complexity. The conclusions listed above provide examples of hypotheses which can be derived from the analyses in this study. Even the analyses on which the conclusions are based can be tested. Obviously, in light of the system-oriented approach, the testing of single hypotheses is less interesting than the testing of systems of hypotheses, or of whole models.

In any marketing system we can distinguish a large number of system "situations" differing with respect to time, space, type of activity, etc. Each situation can be described in terms of the value of the relevant integration variable(s). In a comparison between two situations in a system, or between

different systems, the values of integration, efficiency and other relevant variables, including those in the environment, may or may not be the same.

Adopting a survey approach, we would select certain situations and describe their characteristics. The situations may belong to different systems at one time, or to the same system at different times. Any statistical association between variables can then be identified, by the application of statistical methods.

Experimental studies, in which an integration variable is manipulated according to predetermined patterns, are probably not practicable here except in very limited cases. For example, it might be possible to carry out an experiment in a large system with a high degree of institutional integration. Attempts could be made to establish integration changes in certain selected subsystems, while other subsystems were allowed to act as control groups. However, even in systems of this type, it cannot be assumed that the integration variables will be completely under the control of the experimenter.

A weakness of any sort of partial testing of complex models, i.e. by testing a few of the hypotheses derived from them (or even only single hypotheses), is the difficulty of allowing for interactions between variables. Perhaps a more promising approach would, therefore, be to develop simulation models and then to apply different sorts of validity tests. (Cf. e.g. Amstutz, 1967; Cyert & March, 1963).

Some areas in which the general ideas of this study could be applied are indicated in the section below. Not all of these are directly geared to the integration/efficiency relation in marketing systems as studied here, for example: manufacturer's adjustment to changes in integration, prediction of structural changes in the retail and wholesale trade, and the evaluation of developments in the marketing sector from the point of view of social efficiency. Obviously such applications suggest a multitude of research projects.

Possible Applications

In conclusion it seems fitting to indicate some problem areas in which the ideas put forward in this report may be of some "practical" use.

a) Most directly my findings concern the *decision maker in retail or wholesale units within the marketing system* who wants to analyse changes in integration variables and relate them to efficiency. The integration variables can be seen as action parameters controllable, at least in part, by central components. Cf. appendices 8: 1 and 9: 1, in which several examples are given of changes in action paramenters in the real systems; these are very similar to the integration variables introduced here although they may not be expressed as such by the decision makers. With the help of the system of concepts developed in this study, the decision maker should be able to express

such action parameters more explicitly, to indicate the size of the desired change and, afterwards, to check whether his aim has been achieved. My frame of reference also provides him with some basis for analysing relations between the various integration variables and for "structuring" his analysis of integration/efficiency relations. In my opinion the most important point here is that the decision maker should explicitly consider the interrelations between the integration variables.

b) During the last decade changes in the marketing systems in Sweden, particularly in integration, have faced *manufacturing firms* with a great many problems of adjustment. These have been the subject of much discussion and debate, as frequent conferences, published articles and activities in the trade associations all hear witness.[8]

The *manufacturer's decision processes about most action parameters in the "marketing mix"* should, according to the basic philosophy expressed in chapter 1, be very much concerned with the structure, behavior and efficiency of the systems of retail and wholesale units through which the manufacturer reaches the ultimate buyers. Integration variables express aspects of the systems' structure and behavior that are often of immediate interest to him. A change in decision integration, for instance in *choice of suppliers*, affects the relative importance of the central and the retail components in the manufacturer's selling activity. To think of the central component *or* the retail component as *the* decision making unit might be an oversimplifying and misleading approach. The differences revealed between some real systems with regard to decision integration in *choice of assortment*, may for instance call for different marketing strategies on the part of the manufacturer. It may also be important for him to recognize various combinations of integration variables. As far as he is concerned the effect of, for instance, an increase in decision integration may be different if there is also an increase in homogeneity and/or exclusiveness.

Sometimes the preferences of both manufacturer and system components may appear irrational, unless viewed in light of our present frame of reference. An example: a central component may ask a manufacturer to deliver to a central warehouse instead of to the stores direct, although this will burden the system with higher physical distribution costs. The manufacturer may be unwilling to make the change, although it would mean a fall in his own distribution costs. Why? The central component may be motivated by a desire to raise the value of certain integration variables: exclusiveness (ipso facto), and perhaps also decision integration, internalization and activity transference. The manufacturer, on the other hand, may favor direct deliveries just because the direct contact with store personnel, and store display etc., gives him a

[8] An example of a study geared to these problems is Nyberg (1966). Discussion centers on the problems of Swedish furniture manufacturers in adjusting to changes in marketing systems.

higher degree of independence vis-à-vis the system's central component. For neither side is the question of cost difference in physical distribution of vital importance. It seems to me difficult to explain their standpoints on rational grounds without some reference to the integration concepts.

c) The present focus on the *integration* attributes of the *systems* in the marketing sector should be of interest to anyone making *forecasts of structural developments in the retail and wholesale trades,* e.g. about number of work places, type of service system, assortment, size of store, etc. It is probably only rarely that decisions on structural changes, such as establishing and closing down stores or the adoption of a new service system, are made by the individual retail component without any influence from the central component. Differences in the decision integration and exclusiveness of the systems may, for instance, help to explain why the development of the self-service system in the Swedish retail grocery trade has been more rapid in the consumers' cooperative sector than in the "private" sector.

d) In the present study, efficiency has been regarded entirely from the point of view of the particular marketing system. If instead the object of study is *the efficiency consequences of some kind of development in the marketing sector from the point of view of society* as a whole then the ideas expressed in this study may be of some relevance for two reasons. First, social efficiency cannot be regarded as totally unrelated to efficiency from the standpoint of the system. Secondly, the kind of development within the marketing sector which is the object of an efficiency analysis may be a change in integration or a change in the relative importance on the market of systems with different integration characteristics. Typical examples of this are evaluations of the effects of increasing market shares for systems with high institutional integration.

e) In Sweden the *law pertaining to restrictive trade practices* is geared to certain criteria about what constitutes socially damaging restraint of trade. Restrictions on competition are often of such a kind that they are closely related to integration variables. For example, cartels and other cooperative agreements affect the degree of institutional integration; they may also affect decision integration and execution integration. Refusal to supply a potential customer, or selective selling, may express a policy aimed at increasing or maintaining the degree of decision integration, exclusiveness and/or homogeneity.

One of the main ideas of this study is that an analysis of integration variables is meaningful, regardless of the degree of institutional integration. In applying the law, however, it seems that the authorities' decisions about restrictions on competition which can be expressed in terms of decision or execution integration, often depend on the degree of institutional integration prevailing in the system. The present study is not the place for a discussion of whether or not

this is reasonable; perhaps some basis for such a discussion could, however, be found here.

f) When we try to understand the *rationale behind various marketing activities* on the part of manufacturers or distributors, it may be important to consider the activities not only with regard to consumer behavior but also with regard to relations between internal components and between manufacturers and the marketing system.

The manufacturer's *sales promotion* activity can be regarded, and probably usually is, as a parameter primarily aimed at increasing the consumers' demand for the product in competition with other manufacturers. But it is also possible to see the activity as a parameter aimed primarily at strengthening the manufacturer's bargaining position vis-à-vis the marketing system. If the marketing system exhibits a high degree of decision integration in its activities *choice of assortment* and *choice of suppliers,* then the bargaining strength of the system will probably be high. But the manufacturer's position will improve if his sales promotion plans make it clear to decision makers in the system that consumer demand for the article (or for the promotion measure as such) will be great. Had decision integration in the system instead been low, then a less dramatic sales promotion approach might have been more effective from the manufacturer's point of view. The opposition to various manifestations of the manufacturer's sales promotion, which is sometimes found in marketing systems in Sweden today, probably has its roots, at least in part, in the fear that a high degree of integration (e.g. in *choice of assortment, choice of suppliers, pricing* and *sales promotion*), will become more difficult to maintain.

Another example is represented by the weekly sales promotion programs in the marketing systems. This part of the *sales promotion* activity can be regarded as a means of competition in the traditional sense, aimed at the relation between the retailer and individual consumer. But there are two other ways of looking at it: as a means by which highly integrated marketing systems can obtain advertising allowances, price advantages or other benefits of cooperation with the manufacturer; or, especially in systems with partial institutional integration, as a means of bringing about a higher degree of decision integration and homogeneity in *choice of assortment, pricing* and *sales promotion* than would otherwise be possible.

g) Trade associations often cut across the marketing systems in the sense that retailers and wholesalers are members of different associations. The main purpose of trade associations is to look after the interests of their members. Changes in integration may also change the relative power, influence and efficiency of different component categories in the system. This may of course place officials in the trade associations in a difficult position. What should be their attitude and policy towards changes in integration? Should they, for instance, try to hinder, remain neutral towards, or encourage a development that reduces the discretion of members while aiming to in-

crease the efficiency of the system? The analysis in this study may provide some background against which such policy questions can be discussed.

APPENDIX 1:1 SOME COMMENTS ON THE COURSE OF THE RESEARCH PROCESS IN THIS STUDY

Working as a researcher and consultant with the Swedish Wholesalers' Research Institute, I had already come across problems of integration in the retail and wholesale trades in Sweden, well before the present project was ever thought of. I thus became interested in the subject through my observations of real systems. I also began to do some thinking, that found some expression in a few lectures and articles. I was also at the same time working on an investigation of the structural and marketing problems of the Swedish baking industry which touched on the same subject area.[1/] When a few years later I embarked on more systematic research, the subject was thus not new to me, nor was I completely ignorant of conditions in those marketing systems that I was later to include in the empirical study. The initial research phase resulted in a preliminary model of a marketing system and some preliminary integration concepts. This model corresponds roughly to the model presented in chapter 2 above; the preliminary concepts are, in the main, the same as those presented in chapters 4-6. However, both the model and the concepts have been further developed, refined, and made more explicit, in the course of the rewriting of these chapters. Developments on the model level governed my collection of material for the empirical study, including the operationalizations of the various concepts. This phase of the work is discussed more fully in appendix 4:1. The empirical study has been important for the research process not only in providing a number of findings and observations that can be explicitly reported, but also because the insights into the functioning of these systems that my contacts with the real systems gave me, helped me towards the further development of concepts and models. In a few cases, the way the concepts were subsequently refined also affected their operationalization. For instance, at the start of the empirical study, I was not quite clear how, in operationalizing the concept of decision integration, I should take into account that the control information expressed the intention to influence the decision process and not the realized influence. It is not possible to say how, or to what extent, work on the empirical study has affected my model analyses of the relations between the integration variables and between these variables and efficiency.

Thus the reader will understand that during the research process there have been many transitions between real systems, models and descriptions of real systems. In the early stages of research in a particular area - and I consider research into marketing systems to be at such a stage - it is much more difficult than at later stages (when model-building and empirical research have proceeded further) to distinguish clearly and chronologically within the single research project, between observations of real systems and work at the model

1/ Mattsson (1963)

level. (This difficulty makes it even more important in the presentation of the research report to distinguish between discourses on the model and on the description level.) To design an empirical study, it is necessary to have a model indicating the variables and relations to be measured. On the other hand, to develop a model, it is necessary to know something of the real systems.

APPENDIX 2:1 DEFINITIONS OF THE ACTIVITIES

The activities are described in schedules A 2:1 (retail activities) and A 2:2 (wholesale activities). The schedules indicate the contents of the activities and the boundaries, when these are not quite evident, between their decision and execution processes and between activities themselves. Examples are given of subactivities, dimensions and size of the activity measured in terms of output. The description is brief, for reasons of space. As far as possible I have tried to avoid repeating a wholesale activity description where this has already been given for a retail activity. Thus schedule A 2:2 frequently refers back to schedule A 2:1. Wholesale activities are described more briefly, since this study has been concerned mainly with retail activities. Finally, in schedule A 2:3 I take up some problems of delimitation between retail and wholesale activities.

SCHEDULE A 2:1 Definitions of Retail Activities

Activity	Content, boundaries between execution and decision processes, and examples of subactivities	Delimitation from other retail activities	Dimensions (examples) Asterisk indicates dimensions included in appendices 5:1 and 5:3	Size (output, examples) Asterisk indicates variables used in the empirical study acc. to appendices 5:3 and 6:1
Choice of assortment	Execution process: component keeps a certain assortment available in the store.	Borders on choice of suppliers and ordering, and is to some extent included in sales promotion and establishing stores. Choice of suppliers does not specify any individual products. Ordering is concerned with quantity purchased per article.	Identity of article[x] Identity of type of merchandise Depth of assortment Width of assortment	No. of changes in identity of articles No. of articles Total sales[x]
Choice of suppliers	Execution: negotiations with external suppliers about conditions etc. for retailers; maintaining and changing the composition of the store's set of suppliers. Subactivities: supplier negotiations, taking up suppliers, dropping suppliers, maintenance of a certain combination of suppliers.	Borders on choice of assortment and ordering. Ordering is concerned with articles decided in acc. with choice of assortment from suppliers chosen in acc. with choice of suppliers. The subactivity supplier negotiations also form part of sales promotion.	Identity of suppliers[x] Supplier's approx. share of retailer's purchases[x] No. of suppliers Agreed buying conditions	No. of supplier negotiations No. of suppliers[x] Total purchases[x]

Schedule A 2:1 (cont.)

Ordering	Execution: exchange of information with suppliers about quantity, timing etc. Stock-taking is included in the decision process; so is receiving information from suppliers intended to influence the quantity. Examples of subactivities: production of order forms, sending written orders from RC, verbal exchange of information re orders.	Negotiations about purchase conditions is included in choice of suppliers. Exchange of information with suppliers about whether a particular article shall be included in RC's assortment is included in the decision process of choice of assortment. Ordering is also partly included in sales promotion. Ordering of producer goods is a subactivity of acquisition of material.	Timing of order[x] Technique, transferring information[x] Quantity per article[x]	No. of order occasions Total purchases[x]
Pricing	Execution: sales take place, or can do so, at a certain price per article and acc. to rules re service charges, price differentiation, etc.	Borders on payment routine (sales), price marking, checking out and sales promotion. Pricing does not include transfer of payments, only RC's "preparedness" to allow sales at these prices. Information about prices to consumers is part of sales promotion, checking out or price marking. Pricing of SP-articles is a subactivity of sales promotion.	Price per article[x] Service charges Price differentiation	No. of price changes Total sales No. of articles[x]
Sales promotion	The activity consists of specially timed sales-promoting measures such as weekly programs, special sales, demonstrations, advertising etc. Execution: on the one hand preparations in the shape of supplier negotiations, ordering, goods handling, production of store material, etc. and, on the other hand, the existence of the sales promotion program in contacts with the consumers. Examples of subactivities: supplier negotiations, choice of assortment, ordering goods, sending of advertising messages, production of material, display, sales conversations with consumers, demonstrations, price marking.	There are overlappings between sales promotion on the one hand and choice of assortment, choice of suppliers, ordering, pricing, service, price marking and positioning/refilling on the other.	Identity of article[x] Price[x] Quantity ordered per article[x] Agreed delivery terms Display[x] Size of advertising Advertising media[x] Formulation of advertising messages	Total sales of SP articles[x] Total purchases of SP articles[x] No. of advertising messages[x] No. of display signs[x] No. of SP articles[x]

Schedule A 2:1 (cont.)

Service	The activity consists of personal services to customers over and above that required by checking out in a self-service store, e.g. subactivities auxiliary service, consumer information, home delivery, etc.	Borders on checking out and, in some cases, on sales promotion.	Type of service system Personal information to customers about goods[x] Degree of manual service[x] "Consumer psychology" dimensions	Total sales[x]
Payment routine (purchases)	Concerned directly or indirectly with the transfer of means of payment to suppliers of goods and material and the sending and receiving of information from suppliers or financing institutions regarding these payments. Invoice control is part of the decision process. Subactivities: transfer of payments, transfer of information about payments.	Purchase prices and payment conditions are decided in choice of suppliers. The size of the payment is also influenced by ordering and goods receival.	Technique, transferring means of payment[x] Timing of payments[x]	No. of payment occasions Total purchases[x]
Payment routine (sales)	Placing of payments received for sales at banks etc. In credit sales also accounting and demand routines, and the existence of credit conditions. Subactivities: transfer of payments, transfer of information about payments.	Some overlapping with payment routine (purchases), since payments received can be used immediately for settling invoices etc. Receiving of payments from customers is part of checking out.	Timing of payments Placing of payments received[x] Credit terms[x]	No. of payment occasions Total sales[x]
Goods receival	"Terminal" activities concerned with incoming goods incl. checking of quantity and quality. Subactivities: handling of goods, checking of goods.	Borders on the other goods handling activities except checking out. Receival ends when the article arrives in the store or is placed in its position in the stock-room, and has been checked.	Timing[x] Technique[x] Quantity per delivery	Quantity of goods received (in tons) No. of deliveries Total purchases[x]

Schedule A 2:1 (cont.)

Prepackaging (perishables)	Prepackaging for the consumer of perishables which, in the studied systems, are not always prepacked by the manufacturer.	Price marking of perishables can be part of the same routine as prepackaging. Packaging in direct connection with customer transactions is part of checking out.	Proportion of perishable merchandise type sold prepacked[x] Technique[x]	Quantity prepackaged[x] Total sales of relevant perishables[x]
Price marking	Price marking of goods prior to customer transaction.	Price marking in connection with customer transactions is part of checking out. Mistakes in price marking are instead included in pricing, if the marking results in the article being sold at that price.	Technique[x] Timing Identity of articles that are marked	No. of price-marked packages Total sales[x] Total sales of price-marked articles[x]
Positioning of goods/refilling of shelves	Goods handling subsequent to arrival of article in the store and before checking out commences, and placing of the article in a particular position in the store. Example of subactivities: the existence of a particular position for goods, refilling of shelves in store, goods handling for special display.	Storing includes neither the actual refilling of shelves nor positioning of goods in the store. The activity is partly overlapping sales promotion.	Positioning of merchandise types[x] Technique, refilling[x] Quantity displayed per article[x]	No. of shelf meters in store Total sales[x]
Checking out	Includes goods handling in connection with customer transactions, exchange of information with customer during order, adding prices of articles in the transaction, and receival of payment.	Exchange of information over and above the necessary minimum for checking out is included in service. Price marking and prepackaging (incl. cutting meat) before the customer transaction are included in the corresponding activities.	"Waiting line service"[x] Technique for checking out[x] Meat-cutting technique	No. of customer transactions Total sales[x]

Schedule A 2:1 (cont.)

Storing	Concerned with the "moving" of the goods in the time dimension, and goods maintenance, e.g. maintenance of suitable environment for goods (temperature, humidity, security against theft, rejecting damaged goods etc.) and goods handling not incl. in positioning/refilling.	The storing starts with goods receival and ceases when checking out is complete.	Technique for goods maintenance[x] Quantity stored[x]	Average quantity stored[x]
Acquisition of capital (for investment in retail activities)	Execution: the component covers its existing capital requirements for investments (incl. covering possible losses) by acquiring means of payment (incl. credit). Also included is the use of possible profits from retail activities. Subactivities: Negotiations with external sources of capital, transfer within the system of the total internally available capital, disposal of profits (losses).	Influenced by size of investments, and thus by the other activities in the group "acquisition of resources", and by all retail activities via the effect of these on profits. The activity also borders on payment routine (sales) because the latter affects the placing of in-payments.	Sources of capital acquisition[x] Credit conditions Right of disposal of profits (losses)[x] Quantity acquired	Total vol. of investment Investment in new establishment etc.[x] Capital acquired for new establishment etc.[x] Profit (loss)[x]
Establishing stores	Establishment of entirely new stores (or radical rebuilding of old ones), incl. the acquisition of premises, fixtures, inventory, material and manpower. Negotiations and agreements with external sellers of land, inventory etc. are part of the execution. The activity can also take the shape of the introduction of a unit into the system by means of a change in ownership or main supplier, or by entering into a cooperative agreement. Examples of subactivities: negotiations with external interests, physical building and equipping, acquisition of material, managers and other personnel, choice of assortment, choice of suppliers, goods handling.	As can be seen from the list of subactivities many activities partly overlap the activity establishing stores. Radical rebuilding implies the closing down of the previous premises. The acquisition of capital for establishing stores is incl. entirely in the acquisition of capital.	Location[x] Dimensioning[x] Timing Layout, fixtures[x] Identity of merchandise type[x]	Outflow of goods from newly established premises[x] Capital invested in premises

Schedule A 2:1 (cont.)

Closing down	Cessation of a retail unit's operations within the system. Includes negotiations with external interests, e.g. property buyers, new store owner etc. Operations have ceased when all in- and outflows to or from the unit have ceased, or when the prevailing criteria for system membership have ceased to be fulfilled.	In cases of radical rebuilding, establishing is, by definition, preceded by closing down.	Identity of store[x] Timing External operations in the premises after closing down	Outflow of goods from closed premises before the closing down
Acquisition of managers	Concerns the appointment or resignation/dismissal of leader (owner or manager) of a particular store, and negotiations about, and the existence of economic and other conditions, for the leader in the system. Appointment can take the shape of a new appointment, a transfer within the system, a change of owner or the transfer of a retail component from external to internal status. Resignation/dismissal can also take the shape of change of owner or loss of system membership for an RC.	In some cases the activity is incl. in establishing or closing down, because the acquisition of managers is a subactivity of these activities.	Identity[x] Sources of acquisition Quality Terms of employment	No. of changes in store manager[x]
Acquisition of other personnel	Definitions as for acquisition of managers. Individual transfer within the component is not included.	As for acquisition of managers above.	Identity[x] Sources of acquisition Quality Quantity of manpower[x] Terms of employment[x]	No. employed (excl. manager)[x] No. of personnel changes[x] No. of days' work[x]
Acquisition of material	The acquisition of material used in the execution of retail activities incl. negotiations with external suppliers, and ordering.	Ordering, choice of suppliers and choice of articles are not included in the corresponding activities defined above for consumer goods.	Identity of article[x] Identity of supplier[x] Quantity ordered[x] Agreed delivery terms	Total purchases of material[x]

Schedule A 2:1 (cont.)

Training	In training are included formal courses. Both the giving and receiving of training information are included. Examples of subactivities: production of information material, exchange of information during training, and information processing by the course member. Decision process: includes e.g. formulating written or oral teaching material, and consideration by potential participants of whether or not to take part. Training to be intended for personnel employed on retail activities.	Delimitation from other internal and external information expressed in the requirement for formal courses that are restricted in time and limited to the subject concerned, with the intention that several participants shall be reached by relatively homogeneous information. This excludes the information transferred via consultants, current work instructions, etc. This type of information is included in the decision processes of the relevant activities.	Amount of participation per person[x] Identity of course per person[x] No. of subjects covered	Total time devoted by individuals employed on retail activities to the reception of training information (and processing of same)[x]

SCHEDULE A 2:2 Definitions of Wholesale Activities

Where the definitions of retail and wholesale activities are similar if not identical, the reader is referred to schedule A 2:1. For the wholesale activities choice of suppliers, ordering, pricing, payment routine (purchases), goods receival, storing, and most of the activities in the group "acquisition and transformation of resources", this reference is made to schedule A 2:1 without comment. Some comments appear at the end of this schedule with regard to choice of assortment and acquisition of managers and material.

Activity	Content, boundaries between execution and decision processes, and examples of subactivities	Delimitation from other wholesale activities	Dimensions (examples)	Size (output) (examples)
Selling/ order receival	Execution: providing RC with information with a view to influencing RC's choice of assortment, choice of suppliers and ordering; also receival of information from RC as part of RC's ordering, and "neutral" information from CC in connection with this. The decision process includes choice of messages, while the production of order forms and the sending of messages are part of the execution process. Examples of subactivities: selling, order receival, order handling as preparation for payment routine and order picking.	Borders on payment routine (sales), order picking and pricing. Payment routine starts with compiling the basis for invoicing ; order picking with compiling the basis for the physical handling of goods ordered. These bases may be compiled manually or mechanically as part of the same routine in the handling of incoming orders.	Technique, transfer of information Frequency of contacts per RC Timing Content of message	No. of incoming orders Total sales
Payment routine (sales)	Receiving payments for goods and material transferred to RC or other buyer, and the placing of these payments. Also exchange of information with buyers and possible external interests (banks, collection agencies, etc.) about payments. Subactivites: invoicing, receival of payments, placing of payments, credit control, and exchange of information.	The basis for invoicing comes from order picking. Terms of payment are part of pricing.	Technique, invoicing Technique, receiving payments Technique, credit control Timing of payments Rules re placing of payments received Credit terms	No. of payment occasions Total sales

Schedule A 2:2 (cont.)

In transport	Physical moving of the goods from supplier to wholesale unit's warehouse.	Direct deliveries from supplier to RC is part of out transport. The terminal activity in connection with in transport is goods receival.	Technique Timing Quantity per delivery	No. of ton miles No. of deliveries Total purchases
Order picking	Includes the physical handling of goods ordered, incl. loading of vehicles and dividing retailer packs.	Borders on selling/order receival, out transport and payment routine (sales). See the comments to these activities. Storing includes handling of goods not ordered.	Timing Technique, order picking Technique, packing Technique, loading	No. of order pickings Total sales
Out transport	Transfer of goods from wholesale warehouse to store. Subactivities: moving goods, goods handling in case of reloading during transport.	Terminal activities at the wholesale warehouse are part of out transport. Terminal activities at the store are part of the retail activity goods receival.	Technique Timing Quantity per trip	No. of ton miles Total sales No. of deliveries

Comments on definitions etc. of some activities, for which the reader is otherwise referred to schedule A 2:1

Choice of assortment	Articles included in direct deliveries to RC and not passing through the system's wholesale units are also counted in this activity. This applies also to producer goods used in RC's retail activities.
Acquisition of managers	Department managers are also counted as managers.
Acquisition of material	Only producer goods used by CC for wholesale activities.

SCHEDULE A 2:3 Problems of Delimitation Between Retail and Wholesale Activities

Wholesale activity/ retail activity	Problem	Comments
Selling and order receival/ Ordering	In the wholesale units, execution consists of supplying information to retailers and receiving information from them. Part of the retailer's execution consists of supplying this information to the wholesaler.	The wholesaler's supplying of information is included in part in RC's decision process for ordering. RC's supplying of information is in part the same as the wholesaler's information receival. The production of pre-printed order forms is also part of the execution of both the activities.
Payment routine (sales)/Payment routine (purchases)	The activities can be executed as part of a single operation for settling accounts.	The activities will overlap somewhat, particularly in systems with high institutional integration.
Storing/Storing	To a great extent the activities are substitutes for each other.	The definitions are linked to the type of component in which the storing takes place. All storing at CC is included in the wholesale activity.
Acquisition of capital/ Acquisition of capital	Internal capital accumulation, particularly in systems with high institutional integration, is not usually concerned a priori with either wholesale or retail activities.	No general delimitation can be indicated. Limits can only be drawn when describing separate subactivities.
Training/ Training	Part of a training program intended for personnel in a particular type of component may deal with wholesale and retail activities in a single course. Personnel of both categories may take part together.	Delimitation refers to the type of activity on which the course members are employed. If retail personnel partake in training whose subject is wholesale activities, this is part of the retail activity training. If personnel of both categories take part together, then the two activities overlap.

APPENDIX 4:1 DESIGN AND EXECUTION OF THE EMPIRICAL STUDY

Choice of Systems

Selection was governed by the following requirements:

1. The systems should be of roughly the same size, measured in retail sales.
2. The systems should have similarly composed assortments, with regard to groups of merchandise.
3. Each of the four types of institutional integration should be represented among the systems.
4. The main respondent in the systems chosen should be expected to show a positive interest in the study, and possess good insight into the relevant problems.
5. The systems should be similarly structured as regards CC levels.
6. If several systems were judged equal according to criteria 1-5 the most easily accessible system was selected.

No random selection took place.

As the FII system I chose a regional consumers' cooperative society which had been formed a few years before from a fairly large number of local societies. I considered it to be an advantage that the system had previously been divided into several small FII systems, since the reasons for the merger and experiences of it could also be reported.

The PII-R system, a district in the ICA group, was chosen in two stages. The wholesale company was chosen mainly with regard to (4). The district was chosen mainly in accordance with (6).

The PII-W system, a wholesaler-sponsored chain in the ASK sector, was chosen mainly according to (1) and (4).

In choosing the NII system, it turned out that requirements (1), (2) and (5) reduced the number of possible systems considerably, after a satisficing selection of the other systems had been made. The final choice was geared chiefly to requirement (4).

Choice of Interview Subjects

It has to be accepted that some of the interview questions implied the making of value judgements. Moreover certain questions may have been difficult to answer reliably, since the interviewees could not always be expected to

possess full knowledge of the "reality". I tried to counteract these weaknesses by putting the same or similar questions to several officials at the central components, and to store owners and managers of the retail components in the various systems. Any differences that then arose in the descriptions of existing conditions were subjected to further investigation. Naturally the choice of interview subjects can affect the descriptions supplied. Apart from my main respondents from top management, I also interviewed at the central components the heads of the various departments related to the activities concerned and various persons enjoying close contacts with the retailers, such as consultants and order receivers. In PII-W and NII most of the interviews were made at the lowest CC level, and in FII and PII-R at the two lowest CC levels. In FII some interviews were also made at the highest CC level. In the other systems, data concering this level was obtained at interviews in other central components and retail components. RC interviews took less time than CC interviews, as can be seen from table A 4:1. This was mainly due to the fact that the CC interviews concerned both retail and wholesale activities, that the RC questions were less comprehensive, and that they could be linked up with information obtained during the CC interviews. Table A 4:1 also shows the number of interviewees per system. At CC the average interview time per person was a little over two hours, and at RC a little under. The time spent with the main respondents considerably exceeded the average.

The RCs were selected from store lists, giving store size. The central components had no influence on the selection of RCs, nor were they told later which RCs were being interviewed. The retailers knew this. No random selection took place. It was arranged that large, mediumsized and small stores were all represented. Accessibility also affected the final choice. In two of the systems all the retailers originally asked reacted favorably to the idea of being interviewed. In the other two systems interviews were impossible in about 5 cases out of 10, either because of a direct refusal or because it was difficult to arrange within a reasonable time. In other words, to obtain 5 interviews, 10 names had to be drawn from the list. Naturally objectors and non-objectors may have had different attitudes towards the integration situation in their own systems. Naturally personal attitudes may also have affected the answers to purely factual questions about the execution of activities, the existence of certain information, etc., but presumably not nearly to the same extent.

Table A 4:1 No. of Interviewees and Approximate Total Interview Time (Net) in the Systems

	FII	OII-R	PII-W	NII	Total
Central components					
no. of interviewees	19	14	6	5	44
total time, approx.hours	40	27	19	11	97
Retail components					
no. of stores	3	5	5	4	17
total time, approx.hours	5	9	8	6	28

The Interviews

The interviews were planned for April-May, 1966, but for various reasons were delayed until May-September 1966 with a few test interviews during April of that year. At the test interviews it proved very difficult to use a standardized procedure. The interviewer often had to break off in order to get clarification or allow for interesting digressions. It proved difficult to prepare a natural sequence of questions suitable to all interview subjects. I therefore used an interview guide (appendix 4:2).

I have undertaken all the interviews single-handed. The use of more than one interviewer could have had both advantages and disadvantages. The main advantage would probably have been less risk of serious interviewer bias. Disadvantages could have been: (a) given the unstructured character of the interviews, a team of interviewers would probably have found it difficult to follow a uniform interview pattern; (b) comparisons between systems will probably be more reliable with a single interviewer because any influence from the interviewer will at least be more uniform throughout; (c) if several interviewers had been involved it would not have been so easy for me to use the study of the real systems to get ideas for the analyses of the integration/efficiency relation.

A tape recorder was used where suitable (with regard to the interviewee's expected psychological reaction), although it was never in use at the start of an interview. The advantages or the tape recorder method were that I could concentrate on formulating questions to obtain the answers in the dimensions I required, and that the respondents' answers could be registered much more accurately than by any of the alternative methods. It also saved time. The disadvantage of this method, of course, is that the interviewee may feel inhibited, fearing that others later may be able

to listen to his answers. I tried to overcome this disadvantage by reassuring interviewees that no one other than myself would hear the tape and that the only reason for my using it was to increase the effectiveness of the interview process. After some experimenting with and without the tape recorder, I decided that the advantages of the method outweighed the disadvantages.

The following are the main steps followed in the interviews. The interview guide is reproduced in appendix 4:2.

1. The interviewee was informed of the scope and aim of the research project, of the extent and position in the project of the empirical study, and of the study's independence, both economically and institutionally, of any commercial interests.
2. The main features of the preliminary marketing system and decision models were presented. (The main features of figures 2:1 and 2:3, in their then stage of development.) This and the two following steps applied only to the main respondents in each system.
3. The delimitation of the system was discussed and established.
4. The institutional relations were identified and described.
5. Wholesale and retail activities relevant to the interviewee were discussed with regard to (a) the main features of the allocation of the different levels and stages of the decision process to different components, (b) the contents of the decision process in the different decision stages. Sometimes the description was related to information that existed on paper; more often it was not.
6. The description of the decision processes activity by activity (no. 5 above) was supplemented by questions about the planning and control of the system's operations as a whole, such as budgeting, accounting, etc.
7. The normal execution processes,and any deviations from the normal routine, were described for each activity. Among dimensions that seemed interesting and were included in the description were: time, quantity, sequence, technique, location in the system.
8. The interviewee was questioned about the purpose of the division of the decision process in the system as described in (5) and (6) above.
9. Many of the answers obtained under (8), contained reasons for relations between efficiency and variables linked to execution integration. Supplementary questions were now put about these relations.

10. The interviewee was asked whether any data existed that could illustrate the relations referred to under (8) and (9).
11. A quantitative description of the flows of goods between components and environment, was obtained (acc. to two questionnaires, see appendix 4:3).
12. The regular flow of information between components, and between components and environment, was described. To some extent the interviewee's answers here comprised a summary of data obtained under (5) and (7). The dimensions described were: frequency, media, purpose, type of activity and possible DI-intention, sender, receiver, proportion of the system's RCs that were senders or receivers. Typical examples of written material, such as minutes, internal messages, job descriptions etc. were made available to me.
13. Rules concerning the payments flows between components in the system, and rules concerning the allocation of, and the right to, profit (or loss) in the system were clarified. This step, too, to a large extent involved a summary of information already mentioned.

The sequence of steps (6) - (10) could not always be strictly followed. Sometimes, for example, it seemed natural to discuss points under (7) - (10) together with the survey of activities in (5). Towards the end, therefore, the interviews often took the form of repititions, summaries and clarifications. Two questionnaires were used in collecting some of the data about components and goods flows: one for retailers and one for wholesalers. I went through these questionnaires very carefully with the respondents, both at the time of the interviews and later when the information had been filled in and returned to me.

The retail components were also given a questionnaire regarding the names of all their then suppliers. The three types of questionnaire are reproduced in appendix 4:3. In one or more of the systems it turned out that several questions in the first two questionnaires could not be answered, with the information then available in the system. Therefore any answers to these questions are not reported.

On a basis of the written and recorded records of the interviews, I wrote a report on the conditions in the systems that the investigation was intended to describe. This report was shown to the main respondents, who thus had an opportunity to comment on the description. Some factual errors in the preliminary description could thus be corrected. No changes were made, however, in any of the value judgments noted.

APPENDIX 4:2 INTERVIEW GUIDE[1/]

1. Orientation. (Main respondents, all points; others, a, b, f, g.)

   (a) The study is concerned with different types of integration in the food marketing sector and with the relation between integration and behavior and efficiency in the marketing system. (b) Independence of my own and the project's situation vis-a-vis industry. Association with the Economic Research Institute (EFI). (c) The need for research into integration problems. (d) What I have already done. Main features of the design of the empirical study and its purpose. Choice of systems. Aim of the whole project. (e) Plan of the study for the present system. Persons to interview within the different functions. Request introductions. (f) Plan of the present interview. (g) Emphasize the independent standing of the project. Report to be anonymous. Publication date far in the future. I am dependent on the candor of the interviewees and of their firms. Emphasize strongly the confidential nature of the information I receive; no reports to CC about what individuals within RC or CC have said.

2. Delimiting the system. List of components. Main features of components' tasks.

3. What ownership rights exist between components in the system? Which components belong to the same legal person? What (signed) agreements exist between components? Request copies of any agreements. Ask for brief history of the institutional relations.

4. Rough outline of the location of execution and decision processes in the system.
   (a) Orientation re decision model (acc. to diagram or more briefly[2/]) and list of activities.
   (b) Naturally the decision and execution processes may be located in the same or in different components. For each activity it may be possible to distinguish several alternatives for the location of decisions. I ask first for the most usual location of each activity and then for any deviations. A component is said to influence the decision or execution of another component only if this influence is conscious and intended by the controlling component and the information is consciously received by the recipient. NB. the questions refer to retailers and wholesalers with goods in the assortments of foodstores and food departments.
   (c) The following components are distinguished. Identify components.

1/ Terminology adjusted to match the text of the report.

2/ The diagram was a modified version of fig. 2:3.

(d) The first question refers to choice of assortment, i.e. the taking up or dropping of individual articles in the store's assortment. (Always make clear what the activity involves and where the boundary lies between its decision and execution process wherever this is in doubt.)
Which component(s) carry out the activity? Which component(s) consciously influence(s) the decision? Which component makes the final decision? What other cases are there of decision/execution location? What proportion do these represent?

(e) In comparison with a few years ago, what have been the main changes in the location of decision and execution processes?

(f). Return to (d) and continue with the next activity.

5. Detailed description of the decision processes of the activities. Refer to figure of decision model. Go through activities one by one. Start with typical procedures and then discuss any deviations.

(a) Are there any general decisions about choice of assortment with regard to the different stages in the process. Describe these. In which component, and in what way, have these general decisions been worked out and decided upon? How are these general decisions brought to the notice of those working on the action decisions? (If not the same component.) How exactly is each action decision specified by the general decisions? (In other words if they are followed, how much room do the general decisions leave for variations in the action decision?) How far are the general decisions followed, and how can this be controlled?

(b) In what way is a component's decision influenced by factors other than the general decisions just mentioned?
1. Influence from CC on the action decision. 2. Choice of action decision by CC. 3. Information from external components. 4. The component's own information processing.

Regarding (1). Go through the different parts of the decision process acc. to the figure and describe influence on the choice.
How much? In what way? How is it made known? Documentation? How exact a specification is desired? What remains for the acting component to decide? How far is the influence on the action decision realized? (Can deviations depend on outside circumstances?) Documentation? Review information?

Regarding (2). How is the influence made known? How far is CC's choice followed? Documentation? Review information?

Regarding (3). Sender? Frequency? Purpose?

Regarding (4). Type of information? How is it used in the decision process?

(c) If we compare decision processes activity by activity, what differences are there compared with a few years ago? (For FII, before the merger.)

6. Detailed description of the execution processes of the activities. A description of the execution process, geared mainly to questions such as: when, how much, in what way, by whom, etc. Probing in important dimensions. Do not give the respondent too many leads. Start with the most usual routine for each activity. Deviations. Approx. proportion for each routine. What differentiates the occasions when different routines are used? What, if any, important differences in routines compared with a few years ago.

7. Other more indirect types of influence on activities. The influence we have already discussed has consisted of direct influence on the activity (execution taken over, choice of alternative determined in advance, decision process influenced at earlier stages.)

   However, more indirect influence is also possible. Changes can be made in the conditions contingent on another component's decision making. Examples: price differentiation acc. to quantity purchased, changes in one component's transport procedure leading to changes in another's receival routine. There are of course a number of relations between how one component's activities can influence another's. Here we shall only take up cases where a component consciously, i.e. with a view to influencing another component in a certain direction, executes another activity in a certain way. Go over CC_i/CC_j, CC_i/RC, CC_j/RC for each activity.

   What is meant to be influenced in each activity? How is the purpose of the influence made known to the second component? (Do not influence the interviewee by drawing attention to the activity list.)

8. Total planning and control. Proceed to questions regarding the decision, planning and control processes for the system's total operations.
   1. Goal. (a) How would you describe the goal of the retail activities from CC's point of view? (b) How would you describe RC's goal for operations at its own level? Would CC like to see any changes? Why? (c) In what ways do you think CC can influence RC's goals? In a general way, how can the chances of achieving CC's goals be affected by differences in goals at CC and RC?
   2. (a) Describe the planning of retail operations as a whole in the long run (a year or longer) and in the short run (less than a year). Planning organ, frequency, what the planning covers, bases, relation of planning to the "large

system". (b) Describe the main differences between planning now and a few years ago. (For FII, before the merger.) (c) Review information. Probing dimensions: Review organ. Location of review organ. Frequency of review. Type of data. Method of collection. Completeness. Relevance of data for control. Consequences, at CC and RC, of the achievement or otherwise of goals, and of the realization or otherwise of CC-made decisions.

3. Repeat relevant parts of (1) and (2) with regard to wholesale operations.

9. Reasons for, and effects of, DI and EI. Examination of reasons for a particular degree of DI now, or, where relevant, for changes in DI; the same for EI. Activity by activity. I now have information about the present situation, and about changes in DI, centralization, the execution of activities, etc. My following questions refer to factors which, in your opinion, have given rise to this type of development.

   1. First, a broad question: Generally speaking, there has been a trend towards more (less) decision centralization. (a) Generally speaking, what reasons are there for this? Why? Probing dimensions: DI, EI, Efficiency. (b) What changes in outside circumstances may have affected the general trend? (c) Has it been possible to see the effects of changes in DI? Probing in means-ends hierarchy DI, EI, Efficiency. (If yes.) What type of data, and what does it show? (If no.) How do we know that the trend is not a mistake? (d) The now prevailing level of DI, generally and in toto, could be either higher or lower. Question: Why not even greater centralization? Why not less? (Can be omitted if answers under (a) have dealt with this.)
   2. Go through reasons, external factors, and existence of data, activity by activity according to (1) a - d.

10. Description of the system's information flows.

    (a) We must now identify the information flows that take place with comparative regularity between the components in the system. This will in part be a repetition or summary of the above. A suitable division seems to be according to frequency of information, and senders and receivers of information. Information includes both written and verbal, face-to-face contacts and contact at distance. Main type of message; purpose of influence on an activity in another component; any documentation.

        1. Information to RC from CC_i:

           Daily: Proportion of components, media, type of message, possible DI purpose, documentation.

           Once or twice a week: Proportion of components, etc.

           Once or twice a month, quarter, etc.

           Etc.

2-12. Other alternative directed flows between components pairs. 3 CC components and 1 RC per system means 12 pairs, since flows go in both directions. Frequency provides first basis for classification in every component pair.

(b) Question (a) is repeated for the flows of information between components in the system and the environment.

(c) Are there any important differences in the character of the information flows now as compared with a few years ago? Internal and external flows.

11. Payments flows.

(a) Terms of payment. (b) Principles of price differentiation and cost allocation between components (and between components and environment where relevant). (c) Principles for the allocation of, and the right to, profit (loss) in the various components.

12. Comments on the RC interviews.

These interviews must be shorter than those under 1 - 11 above. Avoid emotive words such as influence, power, control, etc. No tape recorder. (a) Briefly touch upon purpose. CC does not know which RC being interviewed. Interviews not separately registered. (b) Ask, for every activity: How are decisions made? What information has RC got, or gets, and what information does RC pay attention to? Why? Brief description of how the activity is executed at RC. (c) Ask about information flows between RC and environment (see 10 above). (d) Ask whether RC has experienced any relation between changes in II, DI or EI and efficiency, in those cases where such changes have taken place during the past two years.

APPENDIX 4:3 QUESTIONNAIRES USED IN THE EMPIRICAL STUDY

Questionnaire 1 Mainly for retailers

Supplementary questionnaire: Financing new store establishments

Questionnaire 2 Mainly for wholesalers

Questionnaire 3 List of suppliers to retail components

Questionnaires 1 and 2 were answered by officials in one or more CCs. In FII the respondents came from all CC levels, in PII-R from CC_{21} and CC_{22}, and in the other two systems from CC_{31} and CC_{41} respectively. As there were so few respondents, instructions could be given verbally and no written instructions were needed. Some of the questions could not be answered satisfactorily, others became irrelevant in view of the subsequent formulation of the research report. This applied to questions 9 - 11 in questionnaire 2. The answers to these questions have not been included in the report because a planned chapter on measures of efficiency in the different systems was later abandoned, as it proved difficult to collect relevant data. Thus some questions have no equivalent in the report, either directly or indirectly. They have been marked below with an asterisk. The data from questionnaires 1 and 2 was later checked by the respondents on a special form. Some of the original information was then corrected.

Questionnaire 3 was answered by respondents in the systems' RCs.

For reasons of space the following reproductions have been made in closer print than the originals.

QUESTIONNAIRE 1

Retail components:

Data regarding components and goods flows

1. No. of units:	31/12 1965	1964	1962	1960
Stores	....	....	....	....
Mobile units	....	....	....	....

2. Total sales:	31/12 1965	1964	1962	1960
Stores	....	....	....	....
Mobile units	....	....	....	....

3. Geographical boundaries (to be drawn on map) 31/12 1965

Remaining questions refer to stores only.

4. Type of assortment	No. 31/12 1965	Sales 1965	Of which food
Foodstores (more than 50 %)	.....	.....	.....
Food depts. in department stores	.....	.....	.....
Others	.....	.....	.....

5. Structure, foodstores and food depts.

Sales 1965, crowns	No. of stores
Under 500,000	.....
500,000-1,000,000	.....
1,000,000-5,000,000	.....
Over 5,000,000	.....
No. of self-service	.....

6. Assortment structure, width

Merchandise group	No. of stores carrying:	Approx. % proportion of total sales in foodstores and food depts.
Dairy products	.....	.....
Bakery products	.....	.....
Groceries	.....	.....
Meat	.....	.....
Fish	.....	.....
Vegetables, fruit	.....	.....
Misc. food	.....	.....
Misc. non-food	.....	.....
Total	.....	.....

7. Assortment structure, depth

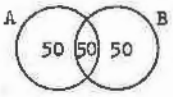
Approximate estimate. Average no. of articles per day (each article=one line on order form etc.) during 1965 in stores of different sizes (in stores carrying relevant merchandise group)

Merchandise group	Size of store: Small -500,000	Mediumsized 500,000-1,000,000	Large 1,000,000-5,000,000	Very large Over 5,000,000
Dairy products	.....	.....	.....	.....
etc. (Merchandise groups as in question 6)				

x 8. Variations in assortment between stores

Estimate of no. of articles in the retail stores in the different merchandise groups in the system as a whole (during an average day). Illustration:

Store A 100
Store B 100
Store A + B 150



	Rough estimate of size of changes: 1965	Since 1963	Since 1960
Dairy products etc.	.....	.....	.....

9. Establishment of new stores No. of foodstores	During: 1965	1964	1962	1960
Established	....	....	....	....
Closed down (no food sales in the system)	....	....	....	....
New to the system, not established there	....	....	....	....
Left the system, but not immediately closed down	....	....	....	....

x 10. Employment in foodstores	1965	1964	1962	1960
No. employed in foodstores as yearly average, recalculated as full-time employed	....	....	....	....

Supplement to Questionnaire 1: Financing and Establishing Stores

Time period: ..... Th. Crs.

Total cost of building, inventory, average stocks and "initiation costs" .....

a) Retailer's own capital acquisition from external sources or own capital (balance) .....

b) Loan from wholesaler, or loan for which wholesale provides security, i.e. ....

c) Loan from wholesaler in "large system", i.e. ....

(In NII data concerned rebuilding. In FII the questions were formulated to allow for the fact that CC_{11} owns all RCs. In this case financing was divided as follows: a) CC_{11}'s own capital, b) external loan direct to CC_{11}, c) increasing debt to CC_{13}.)

QUESTIONNAIRE 2[1/]

Wholesale components:

Data regarding components and goods flows

1. a) List of wholesale components included:

	Site	Type of assortment	Total sales 1965
A.	.....	.....	.....
B.	.....	.....	.....
Etc.			

b) Geographical boundaries (to be marked on map).

2. Total sales
Invoiced sales without double counting in the system. Adjusted for discounts, bonus, etc. Refers to components listed above, or their predecessors. (C & C = Cash & Carry sales)

1/ Another supplementary form regarding wholesale costs has not been reproduced here, since a planned chapter on integration and efficiency was abandoned due to difficulties in obtaining sufficient material.

	1965		1964		1962		1960	
		C&C		C&C		C&C		C&C
a) Total wholesale sales								
Of which:								
to stores in the system	...	...	...	...	...	...	...	...
to stores in the large system (i.e. other co-op or ICA stores, etc.)	...	...	...	...	...	...	...	...
to other customer in the system or the large system	...	...	...	...	...	...	...	...
to customers outside the system altogether	...	...	...	...	...	...	...	...

b) Food sales 1965	Of which	
	Total	In the system
Total	.....	.....
Of which:		
Stored in the system's wholesale components	.....	.....
Invoiced by but not stored in, or ordered from, wholesalers in the system	.....	.....

3. Assortment structure - system's wholesalers

	No. of articles, approx.	Approx. proportion of wholesale sales
a) Now		
Dairy products etc. (Merchandise groups as in question 6, questionnaire 1.)	.....	.....

x b) Development in the system. Estimate only of direction of development and approx. size

	No. of articles			Proportion of sales		
	1964	1962	1960	1964	1962	1960
Dairy products etc.	....	....	....	....	....	....

4. Retailers' purchase flow

	Approx. % proportions from: Wholesalers in the system: through storing (1)	direct from other suppliers (4) but invoiced through CC (2)	Wholesalers in large system (ICA, co-op, etc.) (3)	Others (4)	
Now = 1965					
To foodstores for total sales of:					
Dairy products etc.	.....	.....	.....	.....	100

x b) Development trends

Corresponding approx. % size during 1960 and 1962

		From category (1)	(2)	(3)	(4)
Dairy products	1960	.....	.....	.....	.....
	1962	.....	.....	.....	.....
etc.					

x 5. Estimate of average no. of suppliers per foodstore in different size categories for different merchandise groups during 1965

Delivering and invoicing = D+I
Delivering only = D

	Store size (crowns) -500,000		500,000-1,000,000		1,000,000-5,000,000		Over 5,000,000	
	D+I	D	D+I	D	D+I	D	D+I	D
Dairy products	....	....	....	....	....	....	....	....
etc.								

x 6. Estimate of total no. of suppliers (= delivering and invoicing) for the whole system during 1965

Example:

Store A = 10 suppliers
Store B = 10 "
Store A+B = 15 " if 5 suppliers are common to both

	1965	Approx. size	To foodstores
Dairy products	.....	.....	.....
etc.			

7. a) Average no. of deliveries to foodstores in the system per week, 1965. Counted per store.

	No. of deliveries per week
From wholesalers in the system	
"General" deliveries (groceries,etc.)	.....
Perishable deliveries not incl. in "general"	.....
From wholesalers in the large system (KF, ICA, etc.)	
"General" deliveries	.....
Perishables not incl. in "general"	.....
From suppliers outside the system (if combination of several merchandise groups in one delivery, to be included in main group)	
General	.....
Dairy products	.....
etc.	
Average no. of visits to C&C warehouse by retailers in the system	.....

x b) Estimated total no. of deliveries (e.g. per week) to delivery place outside the system from wholesalers in the system

	General deliveries	Perishable deliveries
to delivery places in the large system (KF, ICA)		
foodstores	.....	.....
non-foodstores (incl. restaurants etc.)	.....	.....
to delivery places outside the system	.....	.....

8. Estimate of no. of orders from stores in relation to no. of deliveries

If no. of deliveries and orders is the same, write 100.
If no. of orders is twice as many as deliveries, write 200.
If no. of orders is half as many as deliveries, write 50.

From:	To:	General deliveries	Perishable deliveries
Internal stores (+ inside the large system)	Internal wholesalers (+ inside the large system)	.....	.....
Internal stores	External wholesalers	.....	.....
External stores	Internal wholesalers	.....	.....

x 9. No. of employees in wholesale components, annual average

	1965	1964	1962	1960
General wholesaling	....	....	....	....
Distribution of perishables (if special personnel)	....	....	....	....

x 10. Average storage time in days during 1965 in the wholesale components

	No. of days
Groceries etc.	.....
Perishables	.....
Misc.	.....

x 11. No. of suppliers (= invoicing units) to wholesale components in the system Total for 1965

Only suppliers of finished goods (i.e. no further refining in the system). Suppliers represented in more than one group, to be referred to the combined group.

	No. of suppliers
Merchandise group	
Diary products	.....
etc.	.....
Combination of two or more merchandise groups	.....

QUESTIONNAIRE 3[1/]

Name of store: .....

List of suppliers

Answers will be treated confidentially. Questions refer to the store's suppliers in different merchandise groups at the present time. Among suppliers are included all wholesalers, manufacturers delivering direct to the stores, or cash-and-carry warehouses, whose articles are included in the store's assortment.

1. Dairy products

   Name ..... Name .....

2. Bakery products

   Name ..... Name .....

3. Groceries

   Name ..... Name .....

4. Meat and cooked meats

   Name ..... Name .....

5. Fish

   Name ..... Name .....

6. Vegetables, fruit (perishables)

   Name ..... Name .....

7. Other foods (incl. deep frozen)

   Name ..... Name .....

8. Non-food products (i.e. toilet articles, stationary, hardware, household goods etc.)

   Name ..... Name .....

1/ The space for the names of the suppliers is not represented here.

APPENDIX 5:1 DEFINITION OF ELEMENTS IN THE TOTAL SET AND RULES FOR COMPOSING THE CHOSEN SET IN THE DIFFERENT DIMENSIONS OF THE RETAIL ACTIVITIES

In chapter 5 I presented the principles for describing the chosen action alternative as a subset (the chosen set) of a total set. In this appendix I shall specify the following, for every retail-activity's dimensions: the elements constituting the total set; how these elements are, in most cases, composed of elements in a basic set and an attribute set; how elements in the total set can be combined to form the chosen set. Three rules for composing the chosen set are distinguished. They have in common that, in light of the particular situation, no elements can be included in the total set, and no element combinations in the chosen set, which seem "unreasonable" to the analyst.

I shall recapitulate the main content of the rules given in chapter 5.

Rule 1. The elements in the total set describe mutually exclusive action alternatives. The chosen set thus always contains one element only.

Rule 2. The elements in the total set describe an attribute that may or may not also be an attribute of the chosen action alternative. Thus each (proper) subset of the total set (that is not "unreasonable") describes an action alternative.

Rule 3. The elements of the total set can be identified as ordered pairs of two sets, the basic set and the attribute set. Not all ordered pairs in the product set of the basic and attribute set are necessarily included in the total set, since some pairs may not represent "possible" action alternatives. To choose a subset of the total set which will constitute an action alternative in a certain case, one of three rules applies:

3a) Each element of the basic set is represented in the subset by one and only one of the ordered pairs.

3b) Each element of the basic set is represented in the subset by one or more of the ordered pairs.

3c) Not every element of the basic set has to be represented in the subset. Otherwise as (3b).

Schedule A 5:1 List of Element Definitions for Describing the Total Set and Rules for the Combination of Elements into a Chosen Set

Activity/ Dimension[1/]	Elements of the total set[2/]		Rule no. for composing the chosen set
	Elements of the basic set[3/]	Elements of the attribute set	
Choice of assortment			
A. Identity of article	Articles in the assortment of present and potential suppliers in the merchandise types carried by the store, as decided in the dimension identity of merchandise type.		2
Choice of suppliers			
A. Identity of suppliers	Present and potential suppliers of goods to the store, of merchandise types as decided in the activity choice of assortment.		2
B. Supplier's approx. share of RC's purchases	Suppliers who, acc. to decision in A, supply the store.	Numbers indicating % interval (1-10, 11-20, etc.). These indicate the supplier's share of the store's total purchases of merchandise types relevant to that supplier.	3a
Ordering[4/]			
A. Timing of order	Type of order, such as main order, extra order, additions or alterations to main order.	Time intervals indicating day 1,2,3,etc. during the time period (a week).	3c
B. Technique for transferring information	As for A.	Technical procedure, such as written order on pre printed form, telephone contact on CC's or RC's initiative, verbal order during RC's visit to CC, etc.	3c
C. Quantity per article	Articles in store's assortment acc. to decision in choice of assortment.	Number indicating no. of retail packages (incl. divided packages).	3h

1/ Dimensions included in measurement of DI acc. to appendix 5:3.

2/ Pairs of elements from the basic and attribute sets, describing completely irrational behavior, are not included in the total set.

3/ In this column are also listed the cases where the element in the total set is not an ordered pair.

4/ The activity is described during a period when at least one main order is sent in (e.g. a week), and only for internal deliveries of groceries etc.

Schedule A 5:1 (cont.)

Pricing			
A.Price per article	Articles in the store's assortment	Number indicating price.	3a
Sales promotion			
A.Identity	Articles in the store's assortment.		2
B.Price	Articles which, acc. to decision in A, are incl. in the store's SP activity.	Number indicating price.	3a
C.Quantity ordered per article	As for B.	Number indicating no. of retailer packages ordered during the period of a particular SP activity.	3a
D.Display	As for B.	Display spot in the store defined acc. to a standard model of a self-service store.	3c
E.Advertising media	Type of media, such as national dailies, local newspapers, direct advertising etc. (incl. no medium).		2
Service			
A.Degree of manual service	Merchandise groups in the store's assortment.	% interval indicating proportion of customer transactions where store personnel contributes information or goods handling over and above that included in checking out and payment routine.	3a
B.Personal information to customers about goods	Articles in the store's assortment.	Attributes, uses etc. of products about which store personnel may provide information.	3c
Payment routine[1/] (purchases)			
A.Timing of payments	Delivieries during the period.	Timing of payments expressed as the (greatest) no. of days after delivery (incl. very late payments as one element).	3a
B.Technique, transferring means of payment	As for A.	Techniques (cash, "automatic giro", account current, etc.)	3a

1/ Refers to internal payments from RC to CC only.

Schedule A 5:1 (cont.)

Payment routine (sales)			
A. Placing of payments received	Methods of placing payments (e.g. bank X, bank Y, "postgiro", cash reserves).	Component on whose account payment is being placed. (CC, RC, store owner, etc.).	3c
B. Credit terms	Transaction of goods with customer.	Type of credit terms (incl. cash payments).	3a
Goods receival 1/			
A. Timing	Type of delivery, such as main delivery of groceries, collection from wholesale warehouse, extra delivery.	Time during the period when goods receival begins (morning day 1, afternoon day 1, morning day 2, etc.).	3c
B. Technique	Occasion of receival during period.	Standardized description of alternatives, e.g. with regard to CC's participation, use of technical aids, method of RC's arrival check. 2/	3a
Prepackaging (perishables)			
A. Proportion of perishable merchandise type sold prepacked	Perishable merchandise types represented in store's assortment.	% intervals, such as 0%, 1-25%, etc., indicating share of sales for prepacked goods.	3a
B. Technique	As for A.	Standardized description of technical alternatives (type of machine, packaging material, etc.).	3c
Price marking			
A. Technique	Articles included in the store's assortment.	Standardized description of technical alternatives.	3b
Positioning/ refilling			
A. Positioning of merchandise types	Types of merchandise represented in store's assortment.	Delimited area in store acc. to standardized description of premises.	3b
B. Quantity displayed per article	Articles in store's assortment.	Intervals such as 0, 1-5, 6-10 etc. indicating average number of units displayed.	3a
C. Technique for refilling	As for A.	Standardized descriptions of technical alternatives.	3b

1/ Refers to internal deliveries only.
2/ "Standardized" means that the description is not specific to the component or system. It has been formulated for general use.

Schedule A 5:1 (cont.)

Checking out A. "Waiting line service"	Numbers indicating longest average waiting line per cash register (in self-service stores) or per sales clerk (in manual stores), without using free capacity in cash registers or sales clerks to lessen the line.		1
B. Technique for checking out	Persons engaged as cashiers (or equivalent in manual store).	Standardized description of technical alternatives (machines, materials, etc.).	3a
Storing			
A. Technique for goods maintenance	Types of merchandise in the store's assortment.	Standardized description of technical alternatives (equipment, maintenance of goods and equipment, rejects etc.).	3b
B. Quantity stored	Articles in the store's assortment.	Number indicating average quantity stored during period in relation to normal day's sales of the article for the period.	3a
Acquisition of capital			
A. Sources	Standardized description of different forms of acquiring capital, such as RC's own assets, loan from CC, loan with CC as guarantor.	% intervals (incl. 0%) indicating proportion of total capital acquisition for investment during the period in RC.	3a
B. Right of disposal of profits (losses)	Standardized description of different alternatives, such as at the disposal of RC, of CC, of the store owner privately, etc. (In the case of loss, the alternatives are concerned with the means for covering this.)	% intervals (incl. 0%) indicating proportion of total profit (loss).	3a
Establishing stores			
A. Location	Potential locations in the system's area of operation.		1
B. Dimensioning	Size intervals indicating total store area.		1
C. Identity of merchandise type	Every merchandise type in foodstores with complete assortment.		2
D. Layout, fixtures	Part of the store area acc. to standerdized division into sections in acc. with merchandise types chosen in C.	Standardized description of alternatives.	3b

Schedule A 5:1 (cont.)

Closing down			
A. Identity of store	Elements are: cessation of operations, continued operations outside the system, and continued operations within the system.		1
Acquisition of managers			
A. Identity	Persons who are, or could be, store managers in the component during the period.		1
Acquisition of other personnel			
A. Identity	Persons who are, or could be, employed in the component during the period.		2
B. Terms of employment	Persons chosen acc. to A.	Standardized description of alternatives (remuneration, other benefits, obligations, etc.).	3a
C. Quantity of manpower	Figure indicating no. of days' work used.		1
Acquisition of material			
A. Identity of article	Articles included in present or potential suppliers' assortment of material for retail activities		2 1/
B. Identity of supplier	Present or potential suppliers of material.		2 2/
C. Quantity ordered	Elements in the chosen set acc. to A.	Number indicating quantity.	3a
Training			
A. Amount of participation per person	Persons employed in RC during the period.	Number indicating time devoted by individual person to training (incl. 0).	3a
B. Identity of course per person	As for A.	Standardized description of course program relevant to system.	3c

1/ Note that the chosen set consists only of material acquired during the period.

2/ Note that the chosen set consists only of suppliers who have supplied material during the period.

APPENDIX 5:2 ON REWARD SYSTEMS AND ECONOMIC REVIEW INFORMATION IN THE STUDIED SYSTEMS

Reward Systems

All the systems operate administrative and economic systems of rewards and sanctions. In FII the store manager's personal economy is not directly affected by price differentials related to RC's behavior; on the other hand it is affected indirectly because the store's result is included as a factor in the performance rating system. In the other systems the price differentials directly affect the economic results of the store and, consequently, the store owner's personal economy.

In FII the administrative rewards system is geared to the promotion, dismissal, demotion or praise and blame of personnel. In the other systems it is geared to (a) the owner's personal "promotion" to a newly established store, (b) his "demotion" from a store which he is not capable of managing in cases where CC has large financial commitments, (c) his transfer to another store or another position in the system on the closing down of his own store, (d) in extreme cases of gross breach of institutionally imposed rules, expulsion of RC from the system, and (e) praise and blame by CC officials.

The administrative evaluations on which administrative rewards are based are closely related to the economic results of RC's operations, which means that there is a connection between the two types of reward. Two examples can illustrate this. Although the store manager in the FII system personally enjoys only a small part of the profits, nevertheless the size of the profit, or any changes in the economic results, will influence CC's judgment of the manager's suitability for promotion. In the long run this can indirectly affect his personal economy. In recruiting store owners for new stores in the PII systems, CC will take into consideration a proven ability to show satisfactory profits.

The boundaries between administrative and economic rewards are unclear. In PII and NII, CC's financial engagement in RC's acquisition of capital can be regarded as part of the economic system of rewards, since it affects RC's economy; but it is also part of the administrative system, since changes in RC's financial situation can lead to closing down the store or "promotion" of the owner/manager to another, newly established, store.

Generally speaking the differences between the administrative rewards in FII on the one hand and PII/NII on the other are as follows. In FII every RC is exposed to evaluations that are related to rewards. In PII (a) - (c) applies only to RCs enjoying, or expecting to enjoy, considerable financial support from CC, or to cases where establishing or closing down is actually taking place.

In FII the extreme sanctions of dismissal or expulsion can, in principle, be applied in cases of serious deviation from the intended DI for any activity. In PII the interviewed CC mentioned serious deviations between intended and realized DI in the activities choice of suppliers and sales promotion as reasons for expulsion. In cases where CC has large financial commitments in RC, serious deviation between intended and realized DI, together with poor economic results, can lead to the "dismissal" of the owner.

Economic Review Information

There are considerable differences between the systems with respect to the quality of CC's information about the situation and development of costs and revenues in the individual RCs.

In FII gross revenues, margins, costs, contribution, size of stocks aud total number of days' work are all budgeted individually for all RCs. Weekly reports are sent to CC with regard to total number of days' work and gross revenues, and monthly reports are sent in with all the data mentioned above. The monthly reports are also sent to CC_{13}.

The following list shows the type of information sent to CC in the other systems. The frequency, and proportion of the system's RCs for which the information is available at CC, are also indicated.

Type of Information, frequency	Proportion of RCs	System
a) Previous year's sales, yearly	All Most	PII-R, PII-W NII
b) Short-run capacity to pay, 2-3 times a month	All	PII-R, PII-W, NII
c) Budget control, cost/revenues		
Monthly	Newly established RCs in which CC has large financial commitments	PII-R

Varying frequency	Individual RCs who ask for consultant help with budgeting	PII-W
d) Profit report		
Monthly	Average figures (in size and area groups) for the approx. 50 % of RCs using CC´s accounting service.	PII-R
Monthly	All RCs in which CC has large financial commitments	PII-R, PII-W
Quarterly, half-yearly	RCs with more than normal supplier credit	NII
e) Balance-sheet		
Every fourth month and/or every year	Individually for all those showing a loss, or enjoying CC´s financial support and using the accounting service and an anonymous sample of all clients of the accounting service	PII-R
Every year	Individual RCs which CC, for some reason, wishes to check. Most of the RCs that CC regards as credit risks (investment credit or trade credit)	PII-W, NII
f) Gross profit, costs Every year	A few RCs (not chosen for financial reasons) who voluntarily supply this information on request	PII-W

The average quality of CC´s information about the costs and revenues of individual RCs (completeness, topicality and precision) can be clearly ranked: 1. FII 2. PII-R 3. PII-W 4. NII. A typical feature in the PII/NII systems is that the quality of the review information at CC is closely related to CC´s financial commitments and to CC´s evaluation of possible credit risks.

APPENDIX 5:3 BASIS FOR RANKING DECISION INTEGRATION BETWEEN THE SYSTEMS

In the following schedule I present the bases on which the rankings of decision integration in table 5:1, are based. The account follows the pattern and the rules laid down in chapter 5. See in particular figure 5:7. The material in this appendix also provides part of the basis for the classification of decision integration in appendix 5:4 and the ranking and classification of activity transference in appendix 6:1. For reasons of space I have had to keep the account in this appendix as brief as possible. For instance, wherever it is clear from the text, I have not specifically identified the rules for ranking intended influence, intended decision integration, DI factors or decision integration. Instead I refer the reader to chapter 5. The definition of elements and rules for the composition of the chosen set can be found in appendix 5:1.

SCHEDULE A 5:3 (pp. 261-295) Basis for Ranking Decision Integration Between the Systems

CHOICE OF ASSORTMENT	See chapter 5.			
CHOICE OF SUPPLIERS	Dimension: A. Identity of supplier B. Supplier's approx. share of RC's purchases Output definition: A. No. of suppliers B. Total purchases			
Rankings	FII	PII-R	PII-W	NII
Intended DI A. Identity of suppliers 1. FII 2. PII-R 2. PII-W 4. NII	RC may only take on new suppliers with permission from CC. In most cases CC wishes to prescribe the action decision acc. to which a supplier is to be dropped. Intended influence is therefore very high overlapping of the chosen set in the controlling set. The no. of elements in the latter is only very slightly over the no. in the chosen set. Intended DI is therefore close to 1.	The aim is that internal suppliers and most of the cooperating suppliers shall be included. For the remaining external suppliers, the intention is indirect influence with slight width and penetration. This is mainly a result of control information, primarily concerned with choice of assortment and SP. Thus the controlling set has more elements than in FII, while the intended influence is less. <	Intention can be described as for PII-R. The number of internal suppliers, cooperating suppliers and others included in the control information is estimated to be approx. the same. These similarities indicate that the size of the controlling set will be about the same as in PII-R.	The intention is that internal suppliers shall be included. For the other suppliers (no cooperating suppliers) the intention is indirect influence, but with less width and penetration than in PII. It is therefore estimated that the controlling set contains more elements than in the PII systems. Intended influence is also less.

Schedule A 5:3 (cont.)

	B. Supplier's approx. share of RC's purchases 1. FII 2. PII-R 2. PII-W 4. NII	For suppliers chosen acc. to dimension A the intention can be formulated as very high overlapping for internal suppliers and high for the rest. Thus CC wants to influence the internal suppliers' shares of RC's purchases so that it falls within a fairly narrow interval, set by CC. The intention with regard to external suppliers is, on an average, less strongly formulated. Existing indirect influence does not affect intended DI beyond the overlapping intention. The highest ratio of RC's total purchases that can be covered by internal purchases is to be found in FII. The ratio of intended influence is highest there, and the controlling set contains fewer elements.	For purchases from internal suppliers, apart from some perishable groups, very high overlapping applies. It is intended that RC's purchase ratio for the relevant groups of merchandise shall remain within a high interval. For the cooperating suppliers, and for some internally supplied perishables, the intention is somewhat less strongly formulated. For the rest of the external suppliers the intention in most cases is indirect influence with slight width and penetration. Control information is then emitted mainly when the primary intention is to influence SP and choice of assortment.	Description of intended DI agrees with that for PII-R except that the internally supplied perishables groups are somewhat differently composed. The ratio of purchases that can be covered by internal suppliers is about the same, despite some differences in the composition of the merchandise groups.	Differs from PII as follows: Internal suppliers can deliver fewer merchandise groups, so that the overlapping intention refers to a smaller part of the activity. No cooperating suppliers. Indirect influence has considerably less width and penetration regarding other suppliers. For explanation of this, see choice of assortment and SP. Intended DI is therefore lower in NII than in the PII systems.
DI-affecting factors	Execution A. and B. 1. FII 2. PII-R 2. PII-W 4. NII	CC carries out almost the whole of the subactivity supplier negotiations. (Note that the subactivity only covers negotiations with RC's external suppliers.)	CC is responsible for negotiations with the cooperating suppliers and, regarding some special agreements, with external suppliers to RC (mostly in connection with SP).	Same as PII-R.	Only in a small no. (compared with PII-R) of special agreements.

Schedule A 5:3 (cont.)

Review information A. and B. 1. FII 2. PII-R 3. PII-W 4. NII	CC obtains review information of a very high quality through its own execution of the retail activity payment routine (purchases).	CC receives continuous information about RC's purchases from internal suppliers and cooperating suppliers through its own execution of the wholesale activity payment routine (sales) and from the sales figures supplied by the cooperating suppliers. CC does usually know RC's total purchase figures only roughly. CC's information of RC's sales figures provide a less satisfactory basis for estimating the purchase share than purchase figures. Some information is also obtained during consultant visits.	CC has somewhat less complete information about RC's sales than in PII-R. (See appendix 5:2) Consultant visits are less frequent than in PII-R.	Information about RC's total sales or total purchases is on an average less complete than in PII-W. (See appendix 5:2.) Visits to the stores by CC personnel less frequent than in PII-W.
Rewards system A. and B. 1. FII 2. PII-R 2. PII-W 4. NII	Serious administrative sanctions can be applied if RC deviates much from intended DI regarding A or B. Administrative evaluations can also occur in connection with the way the intended DI is realized. Quantity discount on internal purchases.	Quantity discount on internal purchases and purchases from cooperating suppliers. Serious administrative sanctions can be imposed (expulsion from the system) if internal purchases fall below 20% of RC's total. This figure is low in comparison with the purchase ratios of by far the majority of the RCs and with the ratio intended by CC. The internal purchase ratio can also be taken into account by CC in its administrative evaluations of RC.	Same as PII-R, except that the threat of expulsion is not as explicitly formulated. Compared with FII the rewards system in PII is less potent and covers a smaller part of the activity. For instance, a reward geared to identity of supplier covers fewer suppliers, or one geared to purchase share covers a smaller part of RC's total purchases.	Quantity discount on internal purchases. Administrative evaluations with, on the whole, less serious consequences than in PII, since fewer RCs are financially dependent on CC and there are fewer cases of new establishment.
External information A. and B. 1. FII 2. PII-R 2. PII-W 4. NII	See schedule 5:4,	See schedule 5:4	See schodule 5:4	See schedule 5:4

Schedule A 5:3 (cont.)

ORDERING

Dimensions: A. Timing of order B. Technique, transferring information C. Quantity per article

Output definition: Total purchases from internal suppliers. (Descriptions in this schedule refer to internal suppliers of groceries etc. only.)

Rankings	FII	PII-R	PII-W	NII
Intended DI A. Timing 1. FII 2. PII-R 3. PII-W 4. NII	Main order (written weekly order) to be sent from RC 3 days before delivery at the latest. Day of delivery decided by CC in wholesale activity out transport. Additions and alterations, by telephone on RC's initiative, only as an exception and at the latest 1 day before delivery day. No fetching of goods at CC's warehouse. Extra orders for deliveries at other times only in very exceptional circumstances. Intention thus complete overlapping. FII has higher intended DI than PII-R because the controlling set is smaller for supplementary orders and because no fetching is allowed. Also the ratio for intended influence is higher.	Main order to be sent from RC 3 days before delivery day at the latest. Day of delivery decided by CC in wholesale activity out transport. Additions or alterations on CC's or RC's initiative 1 day before delivery at the latest. Orders for fetching or sending goods by bus any day, but CC prefers these to be infrequent. Extra orders only in very exceptional circumstances. Orders of SP articles a week earlier than ordinary orders. Intention can be formulated as complete overlapping for main orders, supplementary orders and SP orders, and very high overlapping for fetching and "bus orders". PII-R has higher intended DI than PII-W mainly because the controlling set is smaller for main orders, since these must be in 3 days rather than 2 days before. Moreover the DI intention is higher for orders regarding fetching and SP articles.	Main orders to be sent in 2 days ahead. Additions or alterations 1 day before at the latest, on CC's or RC's initiative. Delivery day decided by CC (in out transport). Orders made on RC visits to cash-&-carry warehouse any time. Thus no DI intention for fetching. Earlier preliminary orders required for some SP articles only. Extra orders only in exceptional cases. PII-W has higher intended DI than NII because the overlapping intention for main orders, supplementary orders and extra orders is higher.	Main orders to be sent in 2 days ahead, but the intention is not complete overlapping. RC can send in main order 1 day before. Additions as late as day of delivery not completely forbidden. Delivery day decided by CC for main orders. Extra orders can be delivered any day (a) to RCs located in same town as CC (b) by public transport (c) for whole vanloads. No intended DI in the time dimension for fetching from cash-&-carry warehouse.

Schedule A 5:3 (cont.)

B. Technique 1. FII 2. PII-R 2. PII-W 4. NII	Identity intention applies to main orders (must always be written) and to supplementary orders (telephone contact on RC's initiative). Thus FII has higher intended DI than PII-R for supplementary orders.	Identity intention for main orders (written), complete overlapping for supplementary orders (telephone contact on CC's or RC's initiative), and identity for fetching (telephone contact on RC's initiative). CC allows part of the main order to consist of orders taken by a manufacturer in the store and sent by him to CC.	Same as PII-R, except that the identity intention for fetching applies to the technique "RC visits CC".	High overlapping for main orders (written). CC accepts that some RCs send in main orders by telephone. Otherwise, same as PII-W.
C. Quantity 1. FII 1. PII-R 1. PII-W 4. NII	Indirect intention except for the rare cases of CC "assigning" SP articles (i.e. CC executes the activity). Indirect intention means, first, that the estimated weekly requirement should be ordered but also that RC should consider the higher price for divided retail packs and the requirement that the store should be well stocked also towards the end of the period. Secondly, the storage and sales budgets fixed by CC for the whole of RC's operations should be kept to. Thirdly, in the case of SP articles, it is often CC's aim to increase the quantity ordered or to fix the sales budget for individual SP articles.	Indirect intention. General recommendation to buy week's requirements and to buy large quantities of SP articles. Budgeting of the sales of individual SP articles. RC should also take into account price additions for divided packs. FII ranked equal with PII-R. Penetration of indirect intention is greater in PII-R because it is estimated that the no. of occasions for transferring control information is greater (more telephone contacts in connection with supplementary orders). On the other hand, width of the indirect intention is greater in FII because the whole of the activity (budgeting) is covered, whereas in PII-R the information concentrates on SP articles.	Same as PII-R, except that RC does not budget SP sales individually for each article and each RC. PII-W ranks equal to PII-R. PII-W has a higher frequency of contact, since many RCs receive control information on their visits to the C-&-C. On the other hand, in PII-R there are more contacts via consultants.	Same as PII-W, except that the width of the indirect influence is less because the extent of the SP activity is less. For this reason NII ranks below the PII systems. Comment applying to all systems: The advice to order the weekly requirement can rarely be realized since most articles as a fact have a lower rate of turnover than corresponds to the retail pack.

Schedule A 5:3 (cont.)

DI-affecting factors					
	Execution A.-C. All equal	CC produces order forms, receives order information, and executes the activity in the rare cases of "assignment" of SP-articles.	Same as FII except that there are no assignment of SP articles. As these are very rare the systems rank equal.	Same as PII-R.	Same as PII-W.
	Rewards system A.B. 1. FII 2. PII-R 3. PII-W 3. NII	A.B. On repeated deviations from intended DI regarding timing and technique, serious administrative sanctions can be imposed. Otherwise, deviations can lead to administrative evaluations.	A.B. 0.5% discount on written main orders received at the right time. To get special SP discount (4-12%), RC must send in orders at right time. Deviations lead to administrative evaluations.	A.B. No economic rewards. Only administrative evaluations.	A.B. Same as PII-W.
	C. 1. FII 2. PII-R 3. PII-W 4. NII	C.Administrative evaluations of budget results. Economic rewards in some SP programs, additional prices for orders on divided packs and quantity discount on some SP articles. FII is ranked above PII-R, although the SP discounts in the latter system probably mean greater rewards for that part of the activity. On the other hand, the administrative evaluations of budget results cover more of the activity.	C. SP discount differentiates between different purchase quantities. Additional prices for orders on divided packs. Administrative evaluations in a few cases where, on account of financial commitments, CC checks RC's operations through budgeting and consultant visits.	C. Quantity discount for SP occurs, but only very rarely. Otherwise same as PII-R.	C. Fewer SP articles with quantity discount than PII-W, because the SP activity is of smaller size. Fewer RCs exposed to administrative evaluations than in PII-W.
	Review information A.B. All equal	CC informed of deviations from intended DI in timing or technique through its own execution of selling/order receival.	Same as FII.	Same as PII-R.	Same as PII-W.

Schedule A 5:3 (cont.)

	C. 1. FII 2. PII-R 2. PII-W 2. NII	Follow-up of budget data.	Ranked below FII because fewer RCs make budget data available.	Same as PII-R.	Fewer cases of budget data, but difference compared with the PII systems is small in relation to total quantity of review information at CC's order receival.
	External information A.-C. 1. FII 2. PII-R 2. PII-W 2. NII	No external influence on timing or technique. Influence by a few external suppliers, with CC's special permission.	Timing and technique affected in some cases by manufacturers' order-taking in store. Greater frequency of supplier-RC contacts than in FII.	Same as PII-R.	Same as PII-W.

PRICING — Dimension: A. Price per article

Output definition: No. of articles

	Rankings	FII	PII-R	PII-W	NII
Intended DI	1. FII 2. PII-R 2. PII-W 4. NII	For nearly 100% of the activity, influence aims at identity. Exceptions are perishables with unstable prices and damaged goods, for which indirect intended influence applies. RC is in such cases to apply margins fixed by CC to calculate prices.	Identity intention for articles in common SP and a few seasonal articles. High overlapping for CC-packed perishables (central price marking usual, but RC can ask for this not to be done). Indirect influence: (a) recommended margins for some perishables (b) in some cases of local price wars (c) CC fears credit losses.	Same as PII-R. SP is on a smaller scale and the indirect influence has less width in NII than in PII-W.	Identity or indirect influence for SP articles. Identity intention applies to RCs in the "advertising group". General recommendation to RC not to follow all price variations of local competitors. Indirect influence includes advice, mostly on RC's initiative, on prices in individual cases for individual articles.

Schedule A 5:3 (cont.)

DI-affecting factors	Execution Not relevant	By definition RC executes the whole activity.			
	Rewards system 1. FII 2. PII-R 2. PII-W 4. NII	Serious administrative sanctions can follow deviations from the identity intention.	Threat of expulsion (in serious cases) or administrative evaluations follow deviations from identity intention for SP-articles. Also administrative sanctions can be imposed for deviations from the indirect influence intention for RCs which are very dependent on CC financially, and which show poor results.	Same as PII-R.	Administrative evaluations following price deviations in weekly campaign articles.
	Review information 1. FII 2. PII-R 2. PII-W 4. NII	As a result of the "internal stock control" at CC, deviations from CC-fixed prices are registered as deviations from what is expected for RC's gross profit, and loss in physical stock. Information also during store visits or through consumers.	CC makes occasional random checks of the pricing of SP articles by visiting stores. Information about price deviations for SP articles may also come from consumers or other RCs in the system. Budget control and consultant visits in a few stores.	Same as PII-R.	Same type of information regarding common SP as in PII-R. The extent of common SP is smaller.
	External information 1. FII 2. PII-R 2. PII-W 2. NII	Some information from consumers or competitors, intended to influence RC's prices.	The approx. price list of the local merchants' organization is a very important source of external information. Consumers and competitors as in FII.	Same as PII-R.	Same as PII-W.

Schedule A 5:3 (cont.)

SALES PROMOTION — Dimensions: A. Identity of article B. Price C. Quantity ordered per article D. Display E. Advertising media

Output definition: A.-E. No. of SP articles

	Rankings	FII	PII-R	PII-W	NII
Intended DI	A. Identity of article 1. FII 2. PII-R 2. PII-W 4. NII	Identity intention for system's common SP, indirect influence for RC's individual SP. The latter is of little extent.	Same as FII except that common SP does not represent such a large share of total SP articles.	Same as PII-R.	For the weekly SP program: Identity for RCs in the advertising group. High overlapping for other RCs. Common SP is less comprehensive than in the PII systems. Indirect influence for individual SP.
	B. Price 1. FII 2. PII-R 2. PII-W 4. NII	Identity for all SP prices.	Identity for common SP. Indirect influence for other SP articles.	Same as PII-R.	For common SP: Identity for RCs in the advertising group and high overlapping for other RCs. For individual SP: Indirect influence with slight width and penetration.
	C. Quantity 1. FII 2. PII-R 3. PII-W 4. NII	For common SP: At least budgeted sales of individual SP articles and of the whole SP program shall be achieved. This means high overlapping. Indirect influence also occurs for all SP activities. Control information is frequent (written reports, store radio, and to lesser extent telephone contact with CC_{12}, during store visits by internal suppliers or by CC_{11}). Occasionally quantities are allocated to RC by CC's action decision.	Same as FII, except that common SP is a smaller part of total SP.	CC does not budget every RC's sales of SP articles. Indirect influence intention as in PII-R.	Width and penetration of indirect influence less than in PII because of the smaller share of common SP and the lower frequency of contact in the transmission of control information about SP articles.

Schedule A 5:3 (cont.)

	D. Display 1. FII 2. PII-R 3. PII-W 4. NII	Very high overlapping according to the "sales points" program for common SP.	Indirect influence. CC wishes to influence display through presentation of written display hints ("sales ideas leaflets") consultant visits, and internal trade journal.	Indirect influence less wide and penetrating than in PII-R. Advice about display covers fewer SP articles, control information less frequent.	Indirect influence less wide and penetrating than in PII-W. Control information very infrequent and covers very few articles.
	E. Advertising media 1. FII 2. PII-R 2. PII-W 4. NII	Identity for choice of media for common SP and identity or indirect influence for individual SP.	Same as FII but ranking affected by the higher proportion of individual SP.	Same as PII-R.	Identity for common SP. No DI intention for individual SP.
DI-affecting factors	Execution A.-D. All equal E. No basis for ranking	No execution.	No execution.	No execution.	No execution.
	Rewards system A.B. 1. FII 2. PII-R 2. PII-W 4. NII C. 1. FII 1. PII-R 3. PII-W 4. NII D.E. 1. FII 2. PII-R 2. PII-W 2. NII	Serious administrative sanctions imposed for great deviations from identity intention for article, price and media. Administrative evaluations of lesser deviations in these dimensions and of deviations regarding display and quantity. In some cases economic rewards to personnel (e.g. competitions) related to the quantity dimension.	Serious administrative sanctions (or evaluations) can follow very great (or great) deviations from identity intention for product and price. Economic rewards for quantity dimension (4-12% quantity discount).	Differs from PII-R only in that extra quantity discount on SP articles rarely occurs.	Administrative evaluations with regard to A. and B. for RCs in the advertising group.

Schedule A 5:3 (cont.)

	Review information A.B.E. 1. FII 2. PII-R 2. PII-W 4. NII	CC's order receival and budget follow-up provides information about A. and C. Information about B. as in the pricing activity. Store visits provide occasional information about A. B. and D. Regarding E. CC certifies invoices.	PII-R differs from FII in that (a) common SP represents a smaller part of the activity, (b) no internal stock-control gives information about B., (c) CC does not certify RC's invoices (E.).	Differs from PII-R in that there is no budget follow-up of SP sales and fewer store visits are made.	Fewer store visits from CC than in PII-W (no store consultants), and less common SP.
	C. 1. FII 2. PII-R 3. PII-W 4. NII	D. 1. FII 1. PII-R 3. PII-W 4. NII			
	External information A.-E. 1. FII 2. PII-R 2. PII-W 2. NII	Suppliers may only visit RC with CC's special permission. This type of influence can be seen to a great extent as a complement to the control information.	RC receives visits not only from suppliers whose products are included in the common SP program, but also from suppliers hoping to influence RC's individual SP activity.	Same as PII-R.	Same as PII-W.

SERVICE — Dimensions: A. Degree of manual service B. Personal information to customers about goods

Output definition: Total sales

	Rankings	FII	PII-R	PII-W	NII
Intended DI	A.Degree of manual service 1. FII 2. PII-R 2. PII-W 4. NII	Use of self-service system for the various merchandise groups acc. to CC's prescribed action decision. Degree of manual service can also be affected by auxiliary services within the self-service system. RC's auxiliary services shall fulfil the criteria for "well-kept store" prescribed by CC, to serve as basis for piece rates. This includes percental ratio of all transactions with auxiliary service (per merchandise group). Intention characterized as high overlapping.	CC suggests action decision re application of self-service system per merchandise group in most cases of new establishment or rebuilding. Indirect influence applies to degree of auxiliary service offered. Intention therefore a combination of high overlapping and indirect influence. Control information acc. to the latter seems to have a somewhat limiting effect on the controlling set acc. to the overlapping intention. Controlling set larger than in FII.	Same as PII-R.	Indirect influence with slight penetration. Control information mainly for rebuilding where CC partakes in the planning. No new establishment during the period studied.

Schedule A 5:3 (cont.)

	B.Personal information 1. FII 2. PII-R 2. PII-W 4. NII	Indirect influence intention. Control information transmitted through internal training, group meetings and internal trade journals.	Indirect influence has on an average less width and penetration than in FII, since fewer RCs take part in internal training.	Same as PII-R. Information less frequent through training, consultants and trade journals. More frequent through group meetings.	No intended DI.
DI-affecting factors	Execution A.B. All equal	No execution.	No execution.	No execution.	No execution.
	Rewards system A.B. 1. FII 2. PII-R 2. PII-W 4. NII	Administrative evaluations of the review information to CC about dimension B. Administrative evaluations of deviations from the days' work budget. Administrative evaluations of sales volume may indirectly lead to evaluations of deviations from DI for dimension B.	Financial help for establishing or rebuilding can be related to adoption of service system suggested by CC.	Same as PII-R.	Fewer cases of establishing/rebuilding than in PII-W.
	Review information A.B. 1. FII 2. PII-R 2. PII-W 4. NII (in A.) 2. NII (in B.)	Customers sometimes complain about RC's service with regard to A. and B. to CC. "Piece rates" presuppose a certain value with regard to degree of manual service, so deviations from intended DI can sometimes be registered. Full DI for investment decisions regarding self-service.	Information about self-service system through consultants and in most cases participation in investment decisions. Very little information about B.	Same as PII-R	Compared to PII fewer store visits.

Schedule A 5:3 (cont.)

	External information	Influence from customers probably very frequent in all systems. No basis for ranking.

PAYMENT ROUTINE (purchases)

Dimensions: A. Timing of payments B. Technique, transferring means of payment

Output definition: Total purchases (from internal suppliers). N.B. The description refers to internal purchases only.

	Rankings	FII	PII-R	PII-W	NII
Intended DI	A.Timing 1. FII 2. PII-W 3. NII 4. PII-R	Identity intention for all payments. Payment through central account current.	Very high overlapping is intended, i.e. exceptions from paying within the prescribed credit period shall be very few.	Cash payment for purchases from C-&-C warehouse and payment exactly on day X for RCs using the "automatic giro" system are intended. Otherwise same as PII-R. Intention can be described as very high overlapping, but with a smaller controlling set than in PII-R.	Compared to PII-W there is no automatic giro. Thus the intention is very high overlapping in a smaller controlling set than PII-R but a larger one than PII-W.
	B.Technique 1. FII 2. PII-R 2. PII-W 2. NII	Identity is intended for all payments. (Payment through account current.)	Either postgiro or payment into bank account should be used. Intention can be described as very high overlapping. The ratios of intended influence and no. of elements in the controlling set are both greater than in PII-W. I consider that these conflicting factors counterbalance each other as far as the ranking is concerned.	Cash payment for purchases at C-&-C warehouse. Otherwise it is intended that most RCs shall use "automatic giro". Intention can be formulated as high overlapping with a smaller controlling set than in PII-R.	Intention formulated as for PII-R, except cash purchases only at C-&-C warehouse. The comment on the ranking of the PII systems also applies to PII-W and NII.
DI-affecting factors	Execution A.B. 1. FII 2. PII-W 3. PII-R 3. NII	CC executes the whole activity.	No execution.	The "automatic giro" technique means that CC informs the bank about the sum to be transferred from RC to CC.	No execution.

Schedule A 5:3 (cont.)

Rewards system A.B. 1. FII 2. PII-W 2. NII 4. PII-R	If RC makes out-payments that deviate from the intended DI, serious administrative sanctions may follow.	System of price differentials that punish deviation in A. Administrative sanctions follow serious deviations in A. (demand for advance payment, refusal to supply). Possibly administrative evaluations with regard to B.	Administrative sanctions for deviations concerning purchases at C-&-C warehouse (RC may be forbidden to buy there). Otherwise as for PII-R.	Same as PII-W.
Review information A.B. All equal	CC's attesting of invoices and cash audit. CC's execution.	CC's execution of wholesale activity payment routine (sales).	Same as PII-R, plus bank statement re transfer transactions in the "automatic giro".	Same as PII-R.
External information A.B. All equal	None.	None.	None.	None.

Comment: In dimension B, PII-W ranks above PII-R for DI, although they were ranked equal with regard to intended DI. This is because PII-W ranks above PII-R for execution and rewards system.

PAYMENT ROUTINE (sales)

Dimensions: A. Placing of payments received B. Credit terms

Output definition: Total sales

	Rankings	FII	PII-R	PII-W	NII
Intended DI	A.Placing 1. FII 2. PII-W 3. PII-R 3. NII B.Credit terms 1. FII 2. PII-R 2. PII-W 4. NII	Identity intended for A. and B. RC to place day's takings in bank prescribed by CC, and to offer no credit.	No DI intended for A. Indirect influence with regard to credit terms (cash sales recommended), except in RCs where CC has heavy financial commitments. In such cases very high overlapping applies (only very little credit allowed).	For A. the intention is high overlapping in the controlling set since for those RC's using the automatic giro payments to cover purchases from CC are to be placed in a particular bank. Same intended DI for B. as in PII-R.	No intended DI.
DI-affecting factors	Execution	A. CC takes part in transfer of information with bank. B. None.	A. Not applicable. B. None.	A.B. None.	A.B. Not applicable.

Schedule A 5:3 (cont.)

	Rewards system A.B. 1. FII 2. PII-R (only B.) 2. PII-W	Serious administrative sanctions can be imposed even for slight deviations in A. Administrative sanctions or evaluations follow deviations regarding B.	Not applicable to A. Administrative evaluations or sanctions can follow deviations regarding B.	No rewards for A. Same as PII-R for B.	Not applicable.
	Review information A. 1. FII 2. PII-W B. 1. FII 2. PII-R 3. PII-W	Internal cash and general audit.	A. Not applicable. B. Monthly report from central accounting service for some RCs.	A. Information by the bank that sufficient amount was available in RC's account. B. Less economic review information than PII-R (appendix 5:2).	Not applicable.
	External information A. 1. FII 2. PII-W B. All equal	A. None. B. Customers requirements.	A. Not applicable. B. As for FII.	A. Sales of the various credit institutes. B. As for PII-R.	Not applicable.

GOODS RECEIVAL

Dimensions: A. Timing B. Technique

Output definition: Total purchases from internal suppliers. N.B. The description refers to internal deliveries only.

	Rankings	FII	PII-R	PII-W	NII
Intended DI	A.Timing 1. FII 2. PII-R 3. PII-W 4. NII	Very high overlapping of the chosen set in the controlling set. Timing to agree with the fixed delivery trips. No. of elements in the controlling and chosen sets almost equal.	Differs from FII in that receival of goods fetched from CC's warehouse may take place at many different times, which means that the controlling set has more elements than in FII.	Same intention as in PII-R except that more purchases are fetched from CC's warehouse.	No. of time points and, therefore, the size of the controlling set, greater than in PII-W. (See description of ordering p. 264.)

Schedule A 5:3 (cont.)

	B.Technique 1. FII 2. PII-R 2. PII-W 4. NII	Very high overlapping of the chosen set. Fewer elements in the controlling set than in PII-R. (Cf. description of homogeneity, schedule 6:2.)	Very high overlapping of the controlling set for CC-executed deliveries. No DI intended for fetching from CC's warehouse.	Fewer elements in the controlling set than in PII-R (cf. schedule 6:2) and fetching from CC's warehouse represents a much larger share of total purchases. The systems are ranked equal since I consider that these conflicting factors cancel each other out.	Fetching at CC's warehouse and delivery by public transport represent a larger share of purchases than in PII-W. No DI intended for such receivals.
DI-affecting factors	Execution A.B. 1. FII 2. PII-R 3. PII-W 3. NII	CC executes out transport of almost all internal deliveries, thus taking part in the first stage of goods receival.	Same as FII, except for goods fetched by RC.	Same as PII-R, except that a greater share of purchases is made during RC's visits to CC.	Same as PII-W.
	Rewards system A.B. 1. FII 2. PII-R 3. PII-W 3. NII	Administrative sanctions follow deviations in A. Administrative evaluations of the utilization of personnel in goods receival may be made following deviations from days' work budget or regarding drivers' piece rate earnings. (Piece rate calculated for a particular goods receival technique.)	Administrative evaluations follow low DI for timing and technique (except for goods fetched by RC).	Compared to PII-R a higher ratio of goods fetched at CC.	Same as PII-W.
	Review information A.B. 1. FII 2. PII-R 3. PII-W 3. NII	CC's execution of part of the activity means that CC has full information as to A. and some as to B. Check on days' work budget may provide indirect indication of deviations regarding technique.	Compared to FII there is no days' work budgeting and there is some fetching from CC.	Compared to PII-R there is more fetching from CC's warehouse.	Same as PII-W.

Schedule A 5:3 (cont.)

	External information A. All equal B. 1. FII 2. PII-R 2. PII-W 2. NII	None.	In some cases information from agencies concerned with establishment and rebuilding with a view to influencing conditions affecting B.	Same as PII-R.	Same as PII-W.

PREPACKAGING

Dimensions: A. Proportion of perishable merchandise type sold prepacked B. Technique

Output definitions: A. Total sales of relevant perishables B. Quantity prepacked

	Rankings	FII	PII-R = PII-W	NII
Intended DI	A. Proportion prepacked 1. FII 2. PII-R 2. PII-W 4. NII	CC wishes that as much as possible of the volume of the various types of perishables should be sold prepacked. Intention can be formulated as very high overlapping. The controlling set is only slightly larger than the chosen set.	CC tries to influence RC to increase the proportion of prepackaged in most types of merchandise. Intention can be described as indirect influence.	No intended DI.
	B. Technique 1. FII 2. PII-R 2. PII-W 4. NII	CC wishes that as much as possible be bought centrally packed. When RC packs, techniques suggested by CC should be used. Intention can thus be described as a combination of complete overlapping and indirect influence.	CC wishes that as much as possible be bought centrally packed but for articles packed by RC the intended DI is not as high as in FII. Internal purchases represent a smaller share of total purchases than in FII.	Indirect influence in some cases where RC itself acquires equipment and materials for packaging to be done in the store.
DI-affecting factors	Execution A.B. 1. FII No ranking between the other systems	CC executes more of the activity than in the other systems. Internal suppliers answer for more types of perishables. Proportion of prepacked is greater than in other systems.	No basis for ranking between PII-R and PII-W regarding proportion of perishables prepacked at CC. The same applies for the PII systems and NII regarding dimension B.	A. Not applicable. B. See PII.

Schedule A 5:3 (cont.)

Rewards system A.B. 1. FII 2. PII-R 2. PII-W 2. NII(B.only)	The addition in price for CC-packed articles is probably lower than the cost of RC's packaging. The piece rate system in the stores is adjusted to the DI intention.	As regards the relation between additional price and cost in RC, same as FII.	A. Not applicable. B. Same as PII.
Review information A.B. 1. FII 2. PII-R 2. PII-W 4. NII(B.only)	Through its execution of selling/order receival, CC is supplied with information regarding RC's internal purchases of prepacked and non-prepacked perishables. Information at consultant visits. CC attests invoices for all purchases of equipment. Budget outcome for number of days' work.	Compared to FII (a) internal purchases of perishables represent a smaller proportion, (b) personnel budgeting in only few cases, (c) no attesting of RC invoices but some RCs buy equipment through CC.	A. Notapplicable. B. No consultant organization. No budget results. CC's assortment contains fewer types of perishables than in the PII systems.
External information A.B. 1. FII 2. PII-R 2. PII-W 2. NII(B.only)	Consumer preferences regarding proportion of prepacked. Fewer external suppliers of perishables than in PII.	Information from consumers as for FII. More external suppliers of perishables than FII.	A. Not applicable. B. Same as PII.

Schedule A 5:3 (cont.)

PRICE MARKING — Dimension: A. Technique

Output definition: Total sales

	Rankings	FII	PII-R	PII-W	NII
Intended DI	A.Technique 1. FII 2. PII-R 3. FII-W 4. NII	In the choice between marking an article at RC or CC, CC's decision shall prevail. Since CC chooses the technique for its own marking, we can say that the intention is identity for part of the activity. With regard to other articles, it is intended that CC's general decision regarding the technique for each type of merchandise shall be followed. Intention can be formulated as very high overlapping. The no. of elements in the controlling and chosen sets are approximately the same.	Identity is intended for non-food articles and high overlapping for the perishables bought prepacked from CC. (RC can buy perishables unmarked.) Indirect influence is intended for other price marking. Control information is transmitted through internal trade journals and store consultants.	Lower DI intended than in PII-R: (a) Less price-marking by CC of CC-packed perishables. (b) No CC price marking of non-food articles. (c) Indirect influence has less width and penetration. It consists of some general recommendations about the price marking of campaign articles and the type of label that should be used, and sometimes advice regarding equipment that RC acquires.	Lower intended DI than in PII-W: (a) CC-packed perishables represent smaller share of total. (b) Indirect influence has slight width and penetration (advice in some cases when RC acquires equipment).
DI-affecting factors	Execution 1. FII 2. PII-R 2. PII-W 4. NII	The part of the activity executed by CC is greater than in the other systems. See appendix 6:1, p. 306.	See p. 306.	See p. 306.	See p. 306.
	Rewards system 1. FII 2. PII-R 2. PII-W 2. NII	Piece rate system in RC adjusted to intended DI. The alternative of buying articles prepacked but not price-marked by CC does not exist. Administrative evaluations of deviations.	No rewards system.	No rewards system.	No rewards system.
	External information	No basis for ranking.			

Schedule A 5:3 (cont.)

	Review information 1. FII 2. PII-R 2. PII-W 4. NII	Consultant visits. Order receival. Invoice control. Certification of invoices for acquisition of equipment. Deviations regarding piece rate earnings and use of personnel can serve as a signal to CC to get more information about RC's execution of price marking and other activities.	Consultant visits. Order receival. Sometimes participation in decision process re acquisition of equipment.	Same as PII-R.	Order receival. Sometimes participation in decisions about acquisition.

POSITIONING OF GOODS/REFILLING OF SHELVES Dimensions: A. Positioning of merchandise types B. Quantity displayed per article C. Technique, refilling

Output definition: Total sales

	Rankings	FII	PII-R	PII-W	NII
Intended DI	A.Positioning 1. FII 2. PII-R 3. PII-W 4. NII	Identity is intended for new establishment and rebuilding, otherwise very high overlapping (controlling set only slightly larger than chosen set).	Very high overlapping for new establishments and some rebuilding. Indirect influence with relatively slight width for other stores. Indirect influence mainly concerns positioning of SP articles. Advice is given by consultants and in written circulars. CC does not want to control the details of this activity.	Same as PII-R regarding new establishments etc. but lower intended DI for SP articles.	Indirect influence intended for rebuilding and in a few cases for SP articles. Thus width and penetration are slight.
	B.Quantity displayed per article 1. FII 2. PII-R 3. PII-W 4. NII	High overlapping for newly established stores. High overlapping or indirect influence for SP articles. Otherwise indirect influence with greater width and penetration than in PII-R. (In FII, the description refers to all types of merchandise and all RCs.)	Indirect influence for all newly established stores and for SP articles. Otherwise indirect influence with slight width and penetration.	Less width and penetration in intended indirect influence than in PII-R (except for newly established stores). Less frequent contacts with consultants, internal trade journals. For SP articles, see p.270.	Indirect influence with slight width and penetration. Influence intended only for a few cases of rebuilding and a few SP articles.

Schedule A 5:3 (cont.)

	C.Technique (refilling) 1. FII 2. PII-R 2. PII-W 2. NII	CC intends that the refilling routine be influenced by (a) CC's description of the normal handling process in goods receival, (b) the store's work schedule, designed by RC and CC together, and (c) CC's criteria for a well-kept store. This can be described as indirect influence with great width and relatively great penetration.	No intended DI.	No intended DI.	No intended DI.
DI-affecting factors	Execution A.-C. All equal	CC takes part in goods handling in newly established or rebuilt stores before opening.	Same as FII.	Same as PII-R.	Same as PII-W.
	Rewards system A.B. 1. FII 2. PII-R 2. PII-W 4. NII	Administrative sanctions for deviations regarding A. in new establishments, and for serious deviations from intended DI in B. for SP articles. Otherwise administrative evaluations (C. also).	For A. administrative evaluations (sanctions) for (great) deviations from intended DI. Administrative evaluations for SP articles in B.	Same as PII-R.	Less SP and established rebuilding than in PII-W.
	Review information A.B. C. 1.FII 1.FII 1.PII-R 2.PII-R 1.PII-W 2.PII-W 4.NII 4.NII	At execution of establishing/rebuilding. Visits from CC personnel. Signal as to abnormal use of personnel through follow-up of days' work budget (C).	Same as FII, except for personnel budget.	Same as PII-R.	Very infrequent store visits from CC personnel.
	External information A.-C. 1. FII 2. PII-R 2. PII-W 2. NII	A few external suppliers have permission from CC to influence quantity displayed and refilling technique during their visits or deliveries to RC.	Greater frequency of external information from external suppliers than in FII. (No restriction by CC. Greater proportion of total purchases made from external suppliers.)	Same as PII-R.	Same as PII-W.

Schedule A 5:3 (cont.)

CHECKING OUT Dimensions: A. "Waiting line service" B. Technique for checking out

Output definition: Total sales

	Rankings	FII	PII-R = PII-W	NII
Intended DI	A. "Waiting line service" 1. FII 2. PII-R 2. PII-W 2. NII	Indirect influence intended regarding the relation between length of waiting line and utilization of free capacity in registers.	No intended DI.	No intended DI.
	B. Technique for checking out 1. FII 2. PII-R 2. PII-W 4. NII	Cash registers etc. acquired by CC. For checking out technique and material, it is intended that in most respects the alternatives specified by CC shall be chosen. The intention can be described in general as complete overlapping. The no. of elements in the controlling set is more than slightly greater than the no. in the chosen set.	Cash registers etc., particularly in the case of new establishment or rebuilding, should be acquired through CC. Checking out material exhibiting the system's emblem should be used. Generally speaking, the intention can be described as a combination of high overlapping and indirect influence with slight width and penetration. The controlling set is considerably larger than the chosen set.	DI intended for acquisition of equipment only. No checking-out material with system's emblem.
DI-affecting factors	Execution	Irrelevant, since the activity is, by definition, executed by RC.		
	Rewards system B. 1. FII 2. PII-R 2. PII-W 2. NII	A.B. Administrative evaluations of days' work and material budgets. Economic rewards in acc. with piece rate system may have some connection with the realization of the intended DI.	B. Administrative sanctions or evaluations if RC deviates from the DI intended in the acquisition of equipment for new establishment or rebuilding.	B. Same as PII.
	Review information B. 1. FII 2. PII-R 2. PII-W 4. NII	A. Customer complaints may reach CC. B. Invoice control for acquisitions. Days' work and material budgets. Consultant visits. Training statistics.	B. Consultant visits. Participation in the decision process of some acquisitions of equipment and invoice information about RC's purchases of material through CC.	B. Fewer store visits from CC personnel than in PII.
	External information B. 1. FII 2. PII, NII	A.B. Customer influence.	Customer influence. External suppliers of materials.	Same as PII.

Schedule A 5:3 (cont.)

STORING — Dimensions: A. Technique for goods maintenance B. Quantity stored

Output definition: Average quantity stored

	Rankings	FII	PII-R	PII-W	NII
Intended DI	A. Technique 1. FII 2. PII-R 3. PII-W 4. NII	CC wishes RC to follow CC's general decisions with regard to goods maintenance. CC makes action decision re acquisition of equipment. Generally speaking the intention can be described as a combination of high overlapping and indirect influence with very great width (whole activity). Controlling set smaller than in PII-R.	A combination of high overlapping and indirect influence applies (equipment and methods) for some types of merchandise. Control information transmitted at consultant visits, through internal training and internal trade journals. Less width in the indirect influence than in FII.	Indirect influence is intended, but with less width and penetration than PII-R (less number of contacts through internal training, trade papers and consultants).	Indirect influence of slight width and penetration. (No acquisition of technical equipment. No consultant organization.)
	B. Quantity 1. FII 2. PII-R 2. PII-W 4. NII	RC's total storing is budgeted by CC who also wishes to exert indirect influence through its DI for ordering (quantity dimension) and choice of assortment. Intention can be characterized as indirect influence with great width but relatively small penetration.	Indirect influence with less width and penetration than in FII. Only through DI for choice of assortment and ordering, except in the case of some RCs where CC has large financial commitments. In these cases the aim is the same as in FII.	Same as PII-R.	No DI-intention.
DI-affecting factors	Execution	Irrelevant. The activity is, by definition, executed by RC.			
	Rewards system A. 1. FII 2. PII-R 2. PII-W 2. NII	Administrative evaluations of maintenance. In some cases the administrative evaluation of the waste percentage might mean that the rewards system conflicts with the intended DI (regarding rejects).	Administrative evaluations of deviations from intended DI in RCs where CC has large financial commitments. Despite the evaluations of waste, FII is ranked above PII-R, since it covers a much larger proportion of the components.	Same as PII-R.	Same as PII-W.

Schedule A 5:3 (cont.)

	B. 1. FII 2. PII-R 2. PII-W	Administrative evaluations of budget results and of possible complaints to CC from customers about stock-outs.	Administrative evaluations of budget results in relevant cases.	Same as PII-R.	Not applicable.
	Review information A. 1. FII 2. PII-R 3. PII-W 4. NII	Consultant visits. Complaints from customers. Execution of acquisition of material. Attesting invoices for equipment acquired. Waste control.	Participation in decision process for acquisition of equipment in many, but not all, cases. Consultant visits. Waste control in a few cases.	Compared with PII-R fewer consultant visits.	Fewer store visits than in PII-W.
	B. 1. FII 2. PII-R 3. PII-W	Budget results for quantity stored. Physical inventory. Short-term balancing of the books. Consultant visits. This information refers to all RCs.	Information corresponding to FII for some newly established RCs where CC has large financial commitments.	Compared with PII-R less comprehensive economic review information and fewer consultant visits.	Not applicable.
	External information A.B. 1. FII 2. PII, NII	Customers' attempts at influencing RC. External suppliers of equipment and goods have less frequent contacts with RC than in the other systems.	More contacts with external suppliers than FII.	Same as PII-R.	Same as PII-W.

ACQUISITION OF CAPITAL — Dimensions: A. Sources of capital acquisition B. Right of disposal of profits (losses)

Output definition: A. Investment in new establishment etc. B. Profit (loss)

	Rankings	FII	PII-R	PII-W	NII
Intended DI	A.Sources 1. FII 2. PII-R 2. PII-W 4. NII	Identity intention. CC acquires all capital.	With a few exceptions CC partakes in the decision process and the intention is overlapping. The controlling set is very slightly greater than the chosen set. The aim is lower for rebuilding etc. than for new establishment.	Same as PII-R.	No new establishment during the period studied. DI as for PII-W for rebuilding etc.

Schedule A 5:3 (cont.)

	B. Right of disposal 1. FII 2. PII-R 3. PII-W 4. NII	Identity intention. RC's profit and loss are incl. direct in CC's economic result (except for the small amount of the profit paid to RC personnel as bonus).	(a) RC's annual bonus on purchases from CC is generally not paid until 5 years later. This can be formulated as an overlapping intention where the controlling set is large in relation to the chosen set. (b) In cases where CC and RC each own 50% of the shares 15% of the profit goes to CC. In these and other cases where CC has large financial commitments in RC, CC requires "consolidation". Thus in (b) the DI intention is considerably higher than in (a) (the controlling set is smaller), but not as high as in FII.	CC's only DI intention concerns "consolidation" for the RCs where CC has large financial commitments.	Compared with PII-W, smaller proportion of cases with large financial commitments on the part of CC.
DI-affecting factors	Execution A. 1. FII 2. PII-R 2. PII-W 4. NII B. Not applicable	CC acquires all capital.	In most cases CC carries out negotiations with external lenders and in some cases makes an agreement in its own name.	Same as PII-R.	Compared with PII-W, a larger proportion of capital is acquired without CC's help.
	Rewards system A. 1. PII-R 1. PII-W 3. NII	There is no legal possibility for RC to enter into agreements with external lenders. The DI factor is thus irrelevant here.	CC can refuse to help in acquiring capital if RC deviates from intended DI (a form of administrative sanction).	Same as PII-R.	Same as PII-W, but ranked lower for the same reason as above.
	B. 1. FII 2. PII-R 3. PII-W 4. NII	Serious administrative sanctions if RC deviates from the intended DI (e.g. embezzlement).	Same as FII for the companies owned 50-50 by RC and CC, and administrative sanctions (e.g. change in the financial help).	No 50-50 companies as in PII-R.	Less commitment on the part of CC than in PII-W.
	Review information A. 1. FII 2. PII-R 2. PII-W 4. NII	CC executes the whole activity.	In most cases CC takes part in new establishment. Information from RC's accounts (acc. to app. 5:2).	Same as PII-R despite differences acc. to app. 5:2, since these apply mostly to RCs without CC investments.	NII ranks below PII-W because CC participation is on a smaller scale.

Schedule A 5:3 (cont.)

	B. 1.FII 2.PII-R 3.PII-W 4.NII	Internal audit. In FII review information covers the whole of the activity.	In the 50-50 companies, complete insight into RC's accounts and auditing of the accounts. Otherwise acc. to app. 5:2. Accounts at CC showing payment of annual bonus to RC.	CC's information about economic results covers (acc. to app. 5:2) less of the activity than in PII-R.	Ranks below PII-W acc. to app. 5:2.
	External information A.B. 1. FII 2. PII-R 2. PII-W 2. NII	A.B. No external information.	A. Financing institutes etc. that have direct contact with RC. B. Financing institutes, suppliers, private persons etc.	A.B. Same as PII-R.	A.B. Same as PII-W.

ESTABLISHING STORES — Dimensions: A. Location B. Dimensioning C. Identity of merchandise type D. Layout, fixtures

Output definition: Sales from newly established stores

	Rankings	FII	PII-R	PII-W
Intended DI	All dimensions 1. FII 2. PII-R 3. PII-W	Identity is intended in all dimensions.	CC acquires store sites for most new establishments. Some sites, however, have been acquired by external components or RCs. CC wishes the latter type of acquisition to represent a small share of all acquisitions. Intention in dimension A. can be formulated as very high overlapping (the controlling set only very slightly larger than the chosen set). Very high overlapping also applies to dimensions B, C, D. For establishments where CC has acquired the site, the controlling set is only slightly larger than the chosen set and smaller than when RC or an external component does the acquiring. The difference between the relative sizes of the controlling sets in the two cases is greater in dimension D. than in B. and C. The intended DI is for all dimensions lower in cases where an existing store is accepted into the system than for new establishments in the narrower sense.	Compared with PII-R a smaller proportion of sites are acquired by CC (see table 6:7). PII-W therefore ranks below PII-R.

Schedule A 5:3 (cont.)

DI-affecting factors All dimensions	Execution 1. FII 2. PII-R 3. PII-W	CC either executes the activity itself or commissions an external component to do so.	In most cases CC acquires the site and holds the lease. In a few cases the store owner has not yet been appointed when the various subactivities take place. The activity is then executed by CC as in FII. In most cases both CC and RC take part in execution of the relevant subactivities in dimensions B - D.	CC-acquired sites represent a smaller proportion than in PII-R.
	Rewards system 1. PII-R 1. PII-W	Not applicable.	If RC deviates from intended DI, CC can impose administrative sanctions by refusing financial help, by choosing another store owner (in extreme cases) or by refusing membership to an external applicant.	Same as PII-R.
	Review information 1. FII 2. PII-R 2. PII-W	The activity is executed by CC or by CC-commissioned agents. This means more complete review information than in the other systems.	CC partakes extensively in the decision process, which means that there is review information about the progress of any particular project. Information about execution as above. All applications for membership of PII-R must be approved by CC.	The smaller proportion of CC-acquired sites (compared with PII-R) does not prevent CC from getting information about planning and execution.
	External information 1. FII 2. PII-R 2. PII-W	None.	External institutes concerned with store establishment, authorities, external suppliers of goods and store material.	Same as PII-R.

Schedule A 5:3 (cont.)

CLOSING DOWN — Dimension: A. Identity of store

Output definition: Sales volume from closed premises before the closing down

	Rankings	FII	PII-R ≈ PII-W	NII
Intended DI	1. FII 2. PII-R 2. PII-W 4. NII	Identity intention.	CC wishes stores to be closed down in the following circumstances: (a) RC has great difficulty in meeting its payments and CC takes a pessimistic view of store's future profitability, (b) the establishing of a new store is hindered by the existing store's existence, (c) the establishment of a new store will make the older store unprofitable. CC wishes stores with acceptable profits and prospects to continue operations, and that RC shall not leave the system to enter into another system unless such a step has been suggested by CC itself. For other RCs there is no intended DI.	Unlike PII no intended DI in connection with new establishment.
DI-affecting factors	Execution 1. FII 2. PII-R 2. PII-W 2. NII	CC executes the activity.	CC carries out negotiations and arranges changes in the conditions of lease for the RCs where CC has signed the lease.	Same as PII.
	Rewards system 1. PII-R 1. PII-W 1. NII	Not applicable since, for legal reasons, CC must execute the activity.	A retailer who closes down his store in acc. with the intended DI can, in some cases, be transferred to another store or be given financial remuneration for the store's goodwill value in connection with a new establishment. By changing its financial support, CC can influence the economic consequences to RC of closing down or not closing down.	Same as PII.
	Review information All equal	Complete review information.	Cessation of operations, or transfer to another system, cannot occur without CC being informed (e.g. via selling/order receival).	Same as PII.
	External information 1. PII-R 2. PII-W 2. NII	Not applicable.	Influence from competing systems which would like RC to change system membership. Influence on store owner from family etc.	Same as PII.

Schedule A 5:3 (cont.)

ACQUISITION OF MANAGERS Dimension: A. Identity

Output definition: No. of changes in store manager

	Rankings	FII	PII-R	PII-W	NII
Intended DI	1. FII 2. PII-R 2. PII-W 4. NII	The intention is identity for all managers taking up positions and for some leaving (transfers and dismissals). The intention is to influence voluntary resignations (prevent or facilitate them) by control information which can be interpreted as a combination of complete overlapping and indirect influence.	For most new establishments the intention is identity. Other cases where some influence is intended are when CC has large financial commitments, or a store owner proves incompetent or wants to hand the store over to another owner. The intention can then be described as a combination of complete overlapping and indirect influence (controlling set considerably larger than the chosen set). The intention is much weaker in cases of a change of owner or of incompetence, if CC has no large financial commitments.	Same as PII-R.	Compared with PII-W there are no new establishments and the proportion of RCs in which CC has financial commitments is smaller.
DI-affecting factors	Execution 1. FII 2. PII-R 3. PII-W 4. NII	CC executes the activity except in cases where the manager resigns voluntarity.	CC carries out the activity for most new establishments, i.e. those for which CC has itself acquired the site.	Smaller proportion of CC-acquired sites than in PII-R.	No execution.
	Rewards information 1. FII 2. PII-R 2. PII-W 4. NII	For legal reasons store leaders must leave their posts if CC decrees it. Administrative evaluations, performance ratings and promotion system (internal recruitment) to prevent undesired resignations.	Differences in the extent of CC's financial support can be related to the DI intention. Offers of alternative employment. Refusal to approve transfer of lease. Expulsion from the system or approval of application for membership. Internal promotion to new establishments.	Same as PII-R.	Compared with PII-W, fewer cases of financial commitment or leaseholding by CC.
	Review information All equal	CC naturally has complete information regarding identity of manager.	CC always receives information about changes of store leader, if in no other way then through executing the wholesale activity payments routine (sales).	Same as PII-R.	Same as PII-W.

Schedule A 5:3 (cont.)

External information 1. FII 2. PII-R 2. PII-W 2. NII	External employers who want to influence store leaders to resign voluntarity. Influence from family etc.	Potential buyers of stores, external store establishment institutes etc. who have acquired the site, and other external employers. Influence from family etc.	Same as PII-R. Same as PII-W.

ACQUISITION OF OTHER PERSONNEL Dimensions: A. Identity B. Terms of employment C. Quantity of manpower

Output definitions: A.B. No. of employed (excl. manager) C. No. of days' work

	Rankings	FII	PII-R = PII-W	NII
Intended DI	A. Identity 1. FII 2. PII-R 2. PII-W 4. NII	Identity is intended for the appointment of more qualified personnel and for dismissals. For transfers and other appointments identity may apply in a few cases, but in most cases the intended influence is indirect or a combination of high overlapping and indirect influence.	Intended DI exists in a few cases only, when surplus personnel from a store that has been closed is to be transferred to other stores in the system. Such cases represent a very small part of the whole activity.	No intended DI.
	B. Terms of employment 1. FII 2. PII-R 2. PII-W 2. NII	Identity is intended for terms of employment.	No intended DI.	No intended DI.
	C. Quantity 1. FII 2. PII-R 2. PII-W 4. NII	There exists a budget for the total number of days' work per week in each RC. DI intention can be described as complete overlapping. The controlling set consists of the budgeted no. of days and a small no. of days that exceed or fall short of the budgeted quantity.	CC helps a few RCs to estimate their personnel requirements. Intention can be described as indirect influence with slight width and penetration.	No intended DI.

Schedule A 5:3 (cont.)

DI-affecting factors	Execution A.C. 1. FII 2. PII-R 2. PII-W	Employment agreements and dismissals agreed upon between CC and the employee.	A.C. No execution. B. Not applicable.	Not applicable.
	Rewards system A.C. 1. FII 2. PII-R 2. PII-W B. Not applicable	A.B. No rewards system for the part of the activity executed by CC. For legal reasons there can be no deviations from intended DI. Administrative evaluations in C. and for the RC-executed part of the activity in A.	A. No rewards system. B. Not applicable. C. Administrative evaluations of budget results for RCs that are heavily committed to CC financially.	Not applicable.
	Review information A.C. 1. FII 2. PII-R 2. PII-W	A. All appointments, resignations, dismissals and transfers are reported to CC. B. CC's execution of the activity, together with paying of wages and work reports to CC, provide CC with almost complete review information. C. Reports from all RCs about the number of days' work each week.	A. In those cases where DI applies, CC obtains information from RC or from transferred employees. B. Not applicable. C. Budget control for a few RCs.	Not applicable.
	External information A. 1. FII 2. PII-R 2. PII-W C. 1. FII 1. PII-R 1. PII-W	A. Work applicants applying to RC direct. These probably represent a smaller proportion per RC than in PII, since CC executes a considerable part of the activity. B. No external information. C. Customers.	A. Work applicants. B. Not applicable. C. Same as FII.	Not applicable.

Schedule A 5:3 (cont.)

ACQUISITION OF MATERIAL — Dimensions: A. Identity of article B. Identity of supplier C. Quantity ordered per article

Output definition: Total purchases of material

	Rankings	FII	PII-R = PII-W	NII
Intended DI	All dimensions 1. FII 2. PII-R 2. PII-W 4. NII	Identity intention in all dimensions for acquisition of material for new establishment and of capital goods. Working material to be chosen from the assortments of suppliers approved by CC. (Complete overlapping.) The controlling sets in these cases are only slightly larger than the chosen sets. Regarding C it is intended that RC shall keep within the budget suggested by CC. Since this budget is not concerned with individual goods, the DI intention can be described as indirect influence (great width and relatively great penetration).	For new establishment and rebuilding which are financed to a considerable extent by CC, intended DI is as high as in FII for dimension B. and nearly as high for A. and C. For other new establishments, the intended DI is smaller, since the products of external suppliers are also accepted. Regarding other acquisitions, purchases should be concentrated to articles included in CC's or with CC cooperating suppliers' assortments. Thus for A. and B. the intention is high overlapping. For C. it is indirect influence with slight width and penetration, except for "budget" cases where the intended indirect influence is the same as in FII.	A.-C. New establishments and rebuilding less than in PII-W. DI intention lower (fewer cases of establishing/rebuilding, no "budget"cases).
DI-affecting factors	Execution A.-C. 1. FII 2. PII-R 2. PII-W 4. NII	CC acquires material (i.e. makes the agreements with suppliers) for new establishments and with regard to capital goods.	In a few cases of new establishment, when the store leader is appointed at a late stage, CC executes the activity.	No execution.
	Rewards system A.-C. 1. FII 2. PII-R 2. PII-W 4. NII	Administrative sanctions for deviations from intended DI in A. and B. and administrative evaluations of budget deviations in C.	As a condition of financial support, CC requires that in new establishments and in the purchase of large capital goods, RC shall not deviate from the intended DI. Quantity discount and administrative evaluations of purchasing loyalty (A.B.). Administrative evaluations of budget results in relevant cases (C.).	Compared with PII a smaller proportion of the activity is geared to establishment/rebuilding and capital goods. No budget cases.

Schedule A 5:3 (cont.)

Review information A.-C. 1. FII 2. PII-R 2. PII-W 4. NII	Checking and attesting of invoices. Execution of part of the activity. Budget control for all RCs.	Participation in the decision process of many acquisitions for new establishments and purchases of capital goods. Order receival. Consultant visits. Budget control for a few RCs.	Fewer store visits by CC personal than in PII. No budget data.
External information A.-C. 1. FII 2. PII-R 2. PII-W 4. NII	None.	External suppliers (excl. cooperating suppliers).	Same as PII.

TRAINING

Dimensions: A. Amount of participation per person B. Identity of course per person

Output definition: Total time devoted to training by individuals

	Rankings	FII	PII-R	PII-W	NII
Intended DI	A. Quantity 1. FII 2. PII-R 3. PII-W 4. NII	The intention is that all employees shall participate or shall have participated in various courses acc. to a training program that is much differentiated acc. to the position of the employee. (E.g. all new employees to take an introductory course. Personnel in specialized positions to take part in cashier courses, fish courses, clerical courses, leaders shall have taken part in special management courses, etc.) The intended DI can be described as indirect influence with great width and penetration.	Internal courses are arranged at the CC_{23} level. Intention there is indirect influence, i.e. personnel is encouraged to partake by means of control information. It is not intended, as in FII, that individuals in different categories shall undergo certain training programs. An exception is the initiation course for new owners, where the intention is identity. For courses arranged externally the intention is indirect influence with less width and penetration than for courses arranged internally.	Training arranged internally takes place on the CC_{33} and CC_{31} levels. Program embraces far fewer courses than in PII-R. External courses are therefore of greater relative importance. Intended DI can be described as indirect influence with less width and penetration than in PII-R.	Internally arranged training at the CC_{43} level acc. to the same course program as in CC_{33}. No training in CC_{41}. DI intention is indirect influence with less width and penetration than in PII-W because of the greater relative importance of external training.

Schedule A 5:3 (cont.)

	B. Identity of course 1. FII 2. PII-R 3. PII-W 4. NII	The internal course program is highly differentiated in relation to the present or potential tasks of the participants. Intended DI can be described as high overlapping of the controlling set. (Controlling set consisting of the courses that CC wishes the individual concerned to take part in.)	Internal program less differentiated in accordance with individual need than in FII. Indirect influence is intended.	Internal course program to which indirect influence is intended is on a smaller scale than in PII-R. (Note that the internal "action group" activity is not defined as training.)	Intended DI is lower than in PII-W, for the same reasons that PII-W's is lower than PII-R's.
DI-affecting factors	Execution A.B. 1. FII 2. PII-R 3. PII-W 4. NII	CC receives training information in those cases where the training is for personnel at CC engaged on retail activities. Sending of training information, production of course material etc. is carried out mostly by CC.	Less sending of training information than in FII. Therefore less execution than in FII. (The extent of CC's receival of training information as compared with RC's is judged to be relatively small in all systems. No account has therefore been taken of any possible differences in this respect.)	PII-W is ranked below PII-R for the same reason that was given for the difference between PII-R and FII.	NII is ranked below PII-W for the same reason that was given for the difference between PII-R and FII.
	Rewards system A.B. 1. FII 2. PII-R 2. PII-W 2. NII	Internal promotion system closely related to the individual employee's training activity. Most courses are paid for by CC and take place during working hours.	Promotion and training are much less related than in FII. Smaller share of individual's training costs paid by CC.	Same as PII-R.	Same as PII-W.

Schedule A 5:3 (cont.)

Review information A.B. 1. FII 2. PII-R 3. PII-W 4. NII	CC has complete information about prior training for all employees and receives information about current course attendance from attendance lists etc.	CC has full information regarding store leaders with regard to internal courses. Regarding other personnel there are attendance lists for internal courses, otherwise unsystematic, incomplete information.	CC does not have any lists of individual owner's or other personnel's training. Unsystematic and far from complete information from attendance lists for internal courses and in individual cases (e.g. training of candidates to ownership of new stores).	Less internal training than in PII-W. Type of information same as in PII-W.
External information A.B. All equal	External arrangers of training programs. Family members etc.	Same as FII.	Same as PII-R.	Same as PII-W.

APPENDIX 5:4 BASIS FOR CLASSIFYING DECISION INTEGRATION

In chapter 5 I presented the rules for classifying the decision integration of an activity. Table 5:2 illustrates the results of the classification. In appendix 5:3 I describe the attributes of the intended DI and the DI-affecting factors which provide the basis for ranking DI between systems. Since the classifications in part share the same base as the rankings, references to appendix 5:3 are essential to an understanding of the present appendix. At risk of inconveniencing the reader, this method was chosen for reasons of space. The evaluations of activity size, the relative sizes of the controlling and chosen sets, the values of the DI factors, etc. are based on descriptions of attributes of the system that I obtained at the interviews. The reader is also referred to the definitions of elements and sets in appendix 5:1. In some activities I considered the basis for classifying an activity too weak in one or more systems. For this reason the following activities have been left out: prepackaging, acquisition of material, closing down, training.

The following account is divided into three schedules, covering the FII, PII and NII systems.

Schedule A 5:4.1 **Basis for Classifying the Decision Integration of Activities in the FII System**

Activity/ dimension	Classification	Evaluation and comments (Page ref. to appendix 5:3 in brackets)[1]
Choice of assortment	Very High	See chapter 5.
Choice of suppliers	Very High	(p. 261) Evaluation: there are less than 3 times but more than 1 1/4 times as many elements in the controlling set for dimension B as in the chosen set. For dimensions A and B the DI factors, except execution, are high.
A. Identity	Very High	
B. Share of RCS purchases	Medium High	
Ordering[2]	Medium High	(p. 264) For A the controlling set is at most 3 times as great as the chosen set. For B, the deviations between no. of elements in controlling and chosen sets are very small. For C, the penetration of the indirect intention is more than slight, since CC follows up the storage budget and SP sales. For A and B the DI factors, except execution, are high.
A. Timing	Medium High	
B. Technique	Very High	
C. Quantity	Low	

1/ For reasons of space I have not commented on cases where the classification is clearly apparent from appendix 5:3, with regard to attributes of intended influence or DI-affecting factors.
2/ Internal ordering of groceries etc. only.

Pricing	Very High	(p. 267) Identity for more than 90% of the activity's extent. High values for rewards system and review information.
A. Price per article		
Sales promotion	Very High	(p. 269) For C and D the no. of elements in the controlling set is at most 3 times as great as in the chosen set. For A,B,C,E rewards system, review information, and external information are high. For D this is so for external information only.
A. Identity of article	Very High	
B. Pricing	Very High	
C. Quantity	Medium High	
D. Display	Medium High	
E. Advertising media	Very High	
Service	Low	(p. 271) For A the controlling set is at most 3 times as great as the chosen set, as a result of the relation between degree of manual service and piece rate system, and of the choice of service for different departments. For B, the no. of contacts is great enough to characterize the penetration of the indirect intention as more than slight. For A, none of the DI-affecting factors exhibit high values.
A. Degree of manual service	Low	
B. Personal information	Low	
Payment routine (purchases)	Full	(p. 273)
Payment routine (sales)	Full	(p. 274)
Goods receival 1/	Very High	(p. 275) Rewards system and review information are high for A and B. For B the no. of elements in the controlling set is more than 25% greater than in the chosen set.
A. Timing	Very High	
B. Technique	Medium High	
Price marking	Very High	(p. 279) No. of articles for which more than one alternative is given in the control information is at most 1/4 of the no. in the store's assortment. The DI factors rewards system and external information are high for the part of the activity executed by RC. Between 1/3 and 1/2 of the activity is executed by CC.
A. Technique		

1/ Internal deliveries only.

Positioning/ refilling	Medium High	(p. 280) In B and C the indirect intention applies to the greatest part of the activity. Hence the classification Low. For A, the controlling set is at most 3 times as great as the chosen and the factors review information and external information are "fairly high".
A. Positioning	Medium High	
B. Quantity displayed	Low	
C. Technique refilling	Low	
Checking out	Medium High	(p. 282) For B, the controlling set has at most 3 times as many elements as the chosen set. Review information is "fairly high".
A. "Waiting line service"	Low	
B. Technique	Medium High	
Storing	Medium High	(p. 283) For A, the controlling set is at most 3 times as large as the chosen set. Review information is "fairly high".
A. Technique	Medium High	
B. Quantity	Low	
Acquisition of capital	Full	(p. 284)
Establishing stores	Full	(p. 286)
Acquisition of managers	Very High	(p. 289) Because a manager may leave against CC's wish, classification cannot be Full DI.
A. Identity of manager		
Acquisition of other personnel	Very High	(p. 290) For A, the combination of identity (for a not inconsiderable part of the activity) or otherwise overlapping and indirect intention (more than slight penetration) has led to Medium High DI. For A and C review information exhibits a high value. For C the controlling set contains at most 4 times as many elements as the chosen set. No comments necessary regarding B.
A. Identity	Medium High	
B. Terms of employment	Full	
C. Quantity	Medium High	

Schedule A 5:4.2 Basis for Classifying the Decision Integration of Activities in the PII Systems

Activity/ dimension	Classification	Evaluations and comments (Page references to appendix 5:3 in brackets)
Choice of assortment	Medium High	See chapter 5.

Choice of suppliers	Medium High	(p. 261) For the greater part of the activity (measured in no. of suppliers) the indirect intention applies for A. For B, where the activity is measured as total purchases, very high overlapping applies to between 1/2 and 2/3 of the activity (internal suppliers and cooperating suppliers). In combination with indirect intention for other parts of the activity the requirements for Medium High DI are fulfilled. Review information is "fairly high" for B.
A. Identity	Low	
B. Share of RC´s purchases	Medium High	
Ordering[1/] (purchases)	Medium High	(p. 264) In both systems, for more than 2/3 of the activity in dimensions A and B, the controlling set has less than 3 or 4 times as many elements as the chosen set. Review information (and in PII-R also rewards system) have high values.
A. Timing	Medium High	
B. Technique	Medium High	
C. Quantity	Low	
Pricing	No or Very Low	(p. 267) Indirect intention, of slight penetration, applies on an average to less than half the activity. SP articles constitute in every period only a small share of the total no. of articles.
A. Price per article		
Sales promotion	Medium High (PII-R) Low (PII-W)	(p. 269) Common SP covers more than 2/3 of the activity but less than 90 %. For A and B, and in PII-R also C, rewards system has a "fairly high" value, and for E this is the case for review information. This has meant a classification of Medium High DI for A,B,E. In C, in the PII-R system, there is very high overlapping, and the controlling set is at most 3 times as great as the chosen set. In PII-W the intention is indirect. For D the penetration of the indirect intention is slight in PII-W.
A. Identity of article	Medium High	
B. Pricing	Medium High	
C. Quantity	Medium High (PII-R) Low (PII-W)	
D. Display	Low (PII-R) No or Very Low (PII-W)	
E. Advertising media	Medium High	
Service	Low	(p. 271) The indirect intention is more than slight for A, since CC intends great influence on the type of service system in a great many of the stores. For B, the indirect intention is of slight penetration.
A. Degree of manual service	Low	
B. Personal information	No or Very Low	

Payment routine[1] (purchases)	Medium High	(p. 273) For A and B the no. of elements in the controlling set are at most 3 times greater than in the chosen set. Review information, rewards system and external information have high values.
A. Timing	Medium High	
B. Technique	Medium High	
Payment routine (sales)	No or Very Low (PII-R) Low (PII-W)	(p. 274) For A, CC's control information in PII-W regarding the "automatic giro" technique aims at less than 2/3 of the activity. In B, more than slight indirect intention only applies in less than 1/4 of the activity.
A. Placing	No or Very Low (PII-R) Low (PII-W)	
B. Credit terms	No or Very Low	
Goods receival[2]	Medium High	(p. 275) For A, the two systems differ because of the greater share of deliveries to RC that are fetched from CC's warehouse in PII-W. For A, review information, rewards system and, in part, execution, have high values. For B, the no. of elements in the controlling is more than 3 times as great as in the chosen set, because the control information specifies little of RC's behavior for the time following CC's participation.
A. Timing	Very High (PII-R) Medium High (PII-W)	
B. Technique	Low	
Price marking	Low	(p. 279) In both systems DI intention is more than slight indirect influence for more than half of the activity.
A. Technique		
Positioning/ refilling	No or Very Low	(p. 280) For A, only a small part of the activity is embraced by the overlapping intention. In both systems the penetration of the indirect intention is slight in B and more than slight in A.
A. Positioning	Low	
B. Display	No or Very Low	
C. Technique, refilling	No or Very Low	
Checking out	Low	(p. 282) For B the combination of high overlapping and indirect intention fit the criteria for Low DI because the controlling set is judged to be considerably (but less than 10 times) larger than the chosen set.
A. "Waiting line service"	No or Very Low	
B. Technique	Low	

1/ Internal payments only.
2/ Internal deliveries only.

Storing	Low	(p. 283) For A, the intended influence is higher than indirect intention with more than slight penetration in both systems. For B, this applies only to the few stores where CC takes part in budgeting.
A. Technique	Low	
B. Quantity	No or Very Low	
Acquisition of capital	Medium High (PII-R) Low (PII-W)	(p. 284) For A, very high overlapping applies in both systems to more than 2/3 of the activity, and the controlling set has at most 3 times as many elements as the chosen set. For A, rewards system and review information are high. For B, the DI intention in PII-W refers on an average to less than 25% of the activity. In PII-R the overlapping intention applies on an average to more than 25% of the activity and I estimate the ratio between the number of elements in the controlling and chosen sets to be between 3 and 10.
A. Sources	Medium High	
B. Right of disposal of profits (losses)	Low (PII-R) No or Very Low(PII-W)	
Establishing stores	Very High (PII-R) Medium High (PII-W)	(p. 286) For A and B the difference between the systems depends on the fact that nearly all new establishments in PII-R are the result of CC's planning and acquisition of a site, whereas in PII-W this does not apply nearly so often. For A and B the controlling set in PII-R is on an average less than 25% larger and in PII-W less than 3 times as large as the chosen set. Review information and rewards system are high for A-D in both systems.
A. Location	Very High (PII-R) Medium High (PII-W)	
B. Dimensioning	Very High (PII-R) Medium High (PII-W)	
C. Identity of merchandise type	Medium High	
D. Layout/fixtures	Medium High	
Acquisition of managers A. Identity of manager	Low	(p. 289) DI intentions acc. to schedule 5:3, taken together, apply to less than 2/3 of the activity.
Acquisition of other personnel	No or Very Low	(p. 290)

Schedule A 5:4.3 **Basis for Classifying the Decision Integration of Activities in the NII System**

Activity/ dimension	Classification	Evaluations and comments (Page ref. to appendix 5:3 in brackets)
Choice of suppliers	Low	(p. 261) For A, indirect intention with slight penetration applies to most of the activity. For B, very high overlapping is the intention for the internal suppliers. This intention applies to more than 25% of the activity.
A. Identity	No or Very Low	
B. Share of RC's purchases	Low	
Ordering[1]	Low	(p. 264) For A, very high overlapping applies but the intention refers on an average to less than 2/3 of the activity because of the cash-&-carry transactions and orders for local distribution. For B, high overlapping applies and the controlling set is on an average less than 3 times as big as the chosen set. For B, review information is high. For C, the penetration of the indirect intention is more than slight since the sending of control information during RC's visits to the cash-&-carry warehouse and during telephone ordering is, on an average, relatively frequent.
A. Timing	Low	
B. Technique	Medium High	
C. Quantity	Low	
Pricing	No or Very Low	(p. 267) Slight penetration in indirect intention. Very few common SP articles in relation to total no. of articles in the store.
A. Price per article		
Sales promotion	Low	(p. 269) For A, B and E very high overlapping of the controlling set applies, on an average, to less than 2/3 but more than 1/4 of the activity. For C, indirect intention applies with more than slight penetration.
A. Identity of article	Low	
B. Price	Low	
C. Quantity	Low	
D. Display	No or Very Low	
E. Advertising media	Low	
Service	No or Very Low	(p. 271)
Payment routine[2] (purchases)	Medium High	(p. 273) Very high (high) overlapping is the intention for A and B and the no. of elements in the controlling set is at most 3 times that in the chosen set. All DI factors except execution have high values.
A. Timing	Medium High	
B. Technique	Medium High	

1/ Internal ordering only.

2/ Internal payments only.

Payment routine (sales)	No or Very Low	(p. 274)
Goods receival[1/]	Low	(p. 275) For A, the no. of time points included in the controlling set is more than 3 times but less than 10 times that in the chosen set for fetching at CC's warehouse, delivery by public transport, and local deliveries. These deliveries represent on an average more than 1/3 of the activity. For B, there is no DI intention for the above type of deliveries. Thus for the average store the overlapping intention applying to deliveries where CC carries out the transport, refers to less than 2/3 of the activity.
A. Timing	Low	
B. Technique	Low	
Price marking	No or Very Low	(p. 279)
Positioning/ refilling	No or Very Low	(p. 280)
Checking out	No or Very Low	(p. 282)
Storing	No or Very Low	(p. 283)
Acquisition of capital	Low	(p. 284) For A, the intention is very high overlapping in the financing of projects in which CC participates. I estimate these to represent less than 2/3 of the activity but more than 1/4.
A. Sources	Low	
B. Right of disposal of profits (losses)	No or Very Low	
Acquisition of managers	No or Very Low	(p. 289) DI intentions apply to less than 1/4 of all RCs.
Acquisition of other personnel	No or Very Low	(p. 290)

1/ Only receival of internal deliveries.

APPENDIX 6:1 BASES FOH RANKING AND CLASSIFYING ACTIVITY TRANSFERENCE ACCORDING TO TABLES 6:2 AND 6:3

In accordance with the method described and exemplified in chapter 6 I present below in schedule A 6:1, with comments, the bases for ranking and classifying some subactivities. For reasons of space, the comments are brief. This appendix can be supplemented by reference to the material in appendix 5:3 on the DI-affecting factor "execution".

Schedule A 6:1 Estimate of the Activity Transference of Some Subactivities

Note the comments that follow the schedule.

Activity/ subactivity	Output variable	Weight	Component ratio				Extent ratio				Ranking and classification
			FII	PII-R	PII-W	NII	FII	PII-R	PII-W	NII	
Choice of suppliers	Total purchases										1. FII Very High
A. Negotiations	(from external	2	1	1	1	1/2	~1	1/5	1/5	1/20	2. PII-R Low
B. Changes	suppliers)	1	1	3/4	3/4	0	3/4	1/10	1/10	0	2. PII-W Low
C. Maintenance		2	1	3/4	3/4	0	3/4	1/10	1/10	0	4. NII No ...
Ordering[1]	Total purchases										1. FII Medium High
A. Production of order forms	(from internal suppliers)	1	1	1	1	~1	1	1	1	1	1. PII-R Medium High 1. PII-W Medium High
B. Sending written orders from RC		1	0	0	0	0	0	0	0	0	1. NII Medium High
C. Ordering by exchange of verbal information		1,2,3[2]	1	1	1	1	1/2	1/2	1/2	1/2	
Sales promotion	See p.										
Payment routine (purchases)[3]	Total purchases										1. FII Very High 2. PII-R Low 3. PII-W Low
A. Transfer of payments		1	1	1	0	0	~1	1/10	-	-	4. NII No ...
B. Transfer of information		1	1	1	1/3	0	9/10	1/10	1/5	-	

1/ Internal orders of groceries etc. only.
2/ Numbers refer to FII, PII, NII.
3/ Incl. external payments.

Schedule A 6:1 (cont.)

Payment routine (sales)	Total sales										1. FII Low 2. PII-R No ... 2. PII-W No ... 2. NII No ...
A. Transfer of payments		1	1	0	0	0	0	-	-	-	
B. Transfer of information		1	1	0	0	0	1/2	-	-	-	
Price marking	Total sales of price-marked articles	1	1	1	1	1	2/5	1/20	1/20	1/20	1. FII Medium High 2. PII-R Low 2. PII-W Low 2. NII Low
Acquisition of capital	Capital acquired for new establishment, etc.										1. FII Complete 2. PII-R Very High 2. PII-W Very High 4. NII Medium High
A. Negotiations with external sources		1	1	~1	~1	2/3	1	3/4	3/4	2/3	
Acquisition of other personnel	No. of personnel changes										1. FII Medium High 2. PII-R No ... 2. PII-W No ... 4. NII No ...
A. Negotiations with personnel		1	1	1/50	1/50	~0	1/2	1/4	1/4	-	

Comments on Schedule A 6:1

Page references to supplementary information in appendix 5:3.

Choice of suppliers — (p. 262) A. In PII the estimate refers mainly to negotiations with "cooperating suppliers" concerning SP, terms of delivery etc. NII does not have any proper cooperating suppliers but negotiates centrally concerning some SP.

Ordering — (p. 265) C. In FII verbal contact is least in comparison with written contact; in NII it is highest. This is why the systems have been allotted different weights. In telephone contacts the input is divided equally between CC and RC.

Payment routine (purchases) — (p. 273) In FII the whole activity, except for some local perishable deliveries and some transfer of information, is carried out by CC. In PII-R CC carries out about 1/2 the activity with regard to "cooperating suppliers"(who account for about 20% of RC purchases). In PII-W payment for internal purchases for about 1/3 of all RCs is made via "automatic giro". Thereby it is estimated that CC executes 1/2 the transfer of information for 2/5 of these RCs' internal purchases.

Comments on Schedule A 6:1 (cont.)

Payment routine (sales)	(p. 274) In FII RC hands in the day's takings to the bank, which increases CC's balance in the CC_{13} account. It is estimated that CC thus executes 1/2 subactivity B.
Price marking	(p. 279) The extent ratios have been estimated in light of an average allocation of the merchandise groups in the store (acc. to an investigation reported in the trade journal, LIVS no. 6/1964), the proportion of price-marked articles in each group, the purchase share from internal suppliers, and the allocation of the price marking of these purchases between CC and RC. In FII all perishables are to a large extent price marked centrally. In PII-R and NII central price marking is concerned mainly with vegetables, and in PII-W with meat and cooked meats.
Acquisition of capital	(p. 285) Despite not inconsiderable participation on the part of external establishment institutions in PII-W (table 6:7), CC takes part in nearly all capital acquisition activities. Investment projects are smaller in NII than in the other systems, and CC's participation is more limited (table 6:6).
Acquisition of other personnel	(p. 290) In FII RC is responsible for a relatively large part of the preliminary negotiations and agreements with new employees. In PII CC sometimes takes part in arranging transfers for personnel, including managers. However, this is very infrequent. In NII it is even more rare.

APPENDIX 6:2 REPORT ON THE SUPPLIER STUDY

The purpose of the supplier study was to show how the EI variable homogeneity can be measured for one dimension (identity of supplier) of one activity (choice of suppliers), and how homogeneity can vary between different systems and different groups of merchandise. All RCs in the various systems were sent a copy of the questionnaire reproduced in appendix 4:3, together with an introductory letter explaining the purpose of the study and emphasizing its independence of the system's central components or any commercial interests. In three of the four systems, CC sent out a circular on much the same lines as my letter, together with a request for the retailer's cooperation. CC's retailer lists were used. The lists indicated RC's approximate annual sales. The number of responses as a proportion of the number of RCs was: in FII 77 %, in PII-R 54 %, in PII-W 61 % and in NII 57 %.

The study describes three aspects of supplier structure: total number of suppliers to the system, average number of suppliers per store, and the homogeneity of the dimension identity of supplier.

Since between 23 % and 46 % of the systems' RCs did not reply to the questionnaire, my estimate of the total number of suppliers had to be adjusted to allow for the suppliers to the non-responding stores. The following method was used.

Responses were listed in the code number order used in the above-mentioned lists of stores. In each system the code numbers indicate a division into four size classes according to annual sales. (Two size classes in the NII system.) The stores were then divided into groups of five, by taking from each size class in turn the store with the lowest remaining code number. The addition to the list of suppliers contributed by each five-group was noted. Apart from a few exceptions, fewer suppliers were added, the later the group was counted. I then estimated a maximum and a minimum expected sum of additional suppliers, had the remaining stores responded. The maximum estimate corresponds to the sum of suppliers added by the most recently counted groups of RCs. The number of RCs in these groups in turn corresponds to the number of non-responses. The minimum estimate was reached by drawing a

free-hand "regression line" for the last five-groups and continuing it to apply to groups of non-responding stores.

The total number of suppliers to the system for the different groups of merchandise, according to the above maximum and minimum estimates, are shown in table A 6:1.

Table A 6:1 Total No. of Suppliers to the Systems' RCs in the Different Merchandise Groups

Group of merchandise	Suppliers to RCs who answered the questionnaire				Estimate for whole system			
	FII	PII-R	PII-W	NII	FII	PII-R	PII-W	NII
Dairy products	5	7	5	6	5	7-11	5-6	6-9
Bakery products	3	65	53	51	3	75-101	73	65-79
Meat and cooked meats	8	28	35	11	8	38	43-45	17
Fresh fish	23	15	15	7	24	15-21	23	8-12
Vegetables, fruit	16	18	33	3	17-19	21-25	39-50	3
Other food[1/]	17	33	48	16	18	35-72	64-72	20-22
Total, food[2/]	69	162	184	91	75-77	181-247	247-269	127-150

With regard to total number of suppliers, the systems rank as follows: 1. PII-W, 2. PII-R, 3. NII, 4. FII. FII has about half as many suppliers as NII and about a third as many as the two PII systems. There is a big difference between FII and the other systems with regard to bakery products and meats. As can be seen, the ranking does not quite agree with the rankings for institutional integration or decision integration (choice of suppliers). In NII the small number of suppliers in relation to these variables may have been affected by demographic conditions (see table 4:2). For instance, compared with PII-W, the system is in an area with low population density and no increase in number of inhabitants. This probably means that the total number of potential suppliers is smaller for NII than PII-W. The difference between NII and PII-R in this respect points in the same direction, but is not as marked.

1/ Suppliers of non-food articles have not been included in any part of the supplier study.

2/ The total number is lower than the sum of all suppliers, since a few suppliers belong to more than one merchandise group. Any internal suppliers of bakery products, soft drinks and meat, have been counted as separate suppliers, as have certain wholesale units in CC_{13}.

Table A 6:2 shows the average number of suppliers to the responding stores, classified according to size class and merchandise group.

Table A 6:2 Average No. of Suppliers per Store, Classified According to Size Class and Merchandise Group[1/]

Store size	Small stores				Large stores				All stores			
Merchandise groups	FII	PII-R	PII-W	NII	FII	PII-R	PII-W	NII	FII	PII-R	PII-W	NII
Dairy products	1.6	1.3	1.7	1.5	2.4	1.6	1.8	1.8	1.9	1.4	1.8	1.6
Bakery products	1.2	3.5	5.2	2.7	1.2	6.7	6.8	4.3	1.2	4.6	6.3	3.1
Meat, cooked meats	1.1	1.7	2.5	1.7	1.8	3.1	3.1	1.7	1.3	2.2	3.0	1.7
Fresh fish	0.2	0.1	0.3	0.3	4.2	0.7	0.7	0.5	1.6	0.3	0.6	0.4
Vegetables, fruit	2.5	1.5	2.3	1.6	3.5	2.1	2.3	2.0	1.9	1.7	2.3	1.7
Other food	2.7	2.0	5.3	2.5	4.2	3.2	5.8	3.6	3.2	2.4	5.8	2.8
Total, food	7.9	8.8	15.3	8.9	15.6	15.9	18.5	12.4	10.7	11.2	17.8	10.3

The average total number of suppliers is roughly the same in all the systems except PII-W, which has a higher average. In the group "small stores", PII-W has almost twice as many suppliers as the others. If all internal manufacturer and wholesale units delivering direct to the stores were counted as one supplier, FII's average for "small stores" would be reduced from about 8 to about 5.

The relatively small difference between the systems with regard to average number of suppliers per store, in combination with the large difference in total number of suppliers to all the system's RCs, implies that the difference between stores is smallest in FII and greatest in PII-W. My calculation of the value of the homogeneity variable points in the same direction.

Homogeneity in table 6:8 (p. 126) has been calculated as follows. Each supplier has been weighted with the number of stores on whose lists he appears. The weighted sum of suppliers appearing on at least 3/4 of all respondents' lists has then been divided by the weighted sum of all suppliers.

1/ Arithmetical mean. The "large stores" have an annual turnover of more than 1 million crowns. A few stores which could not be classified as to size, since they did not reveal their identity, have been included among "all stores". See also footnote 2, table A 6:1.

APPENDIX 7:1 SOURCES OF SCHEDULES IN CHAPTER 7

Every relation between variables in schedules 7:2-7:6 has its equivalent in the literature, as shown below in schedules A 7:1 and A 7:2. The references are incomplete in the sense that reference is not made for all the relationships mentioned by an author if there is an overlapping between several authors.

Schedule A 7:1 Identification of Source References in Schedule A 7:2

Source	Ref.code no.	Page reference	Found in relation no. (E after the figure indicates that the relation is found in schedule 7:6.)
Cole (1952)	C	9-38	14
Duddy & Revzan (1953)	DR	207f.,218f.,545	14,15,7E,11E
Fog & Rasmussen (1965)	Fo	519-530	1,8,12,13,16,5E,10E
Fulop (1962)	Fu	116-145	1,2,3,4,7,8,9,12,13,14,15,16
Fulop (1964)	Fu	12-33,76-84	3E,4E,8E,9E,10E,11E
Galbraith (1956)	G	108-134	5E
Hall,Knapp & Winsten (1961)	H	64f.,114,134f.	6,7,9,10,14,1E,2E
Holton (1962)	Ho	276-281	16,1E,9E
Jeffereys (1954)	J	463	14
Kristensson (1960)	K	B3-B4	2E,3E,4E,12E
Mueller & Garoian (1961)	M	48-50,68-72	1,7,12,13,14,5E
Stacey & Wilson (1965)	SW	35-46,87-98, 225-237	4,10,11,15,1E
af Trolle (1963)	Tr	155-158,175-179	1,2,3,4,5,7,8,12,13,14,16
Törnqvist (1933)	Tö	38-44	1,2,4,7,9,12,13,14,6E
Törnqvist (1937)	Tö	24-35	

Schedule A 7:2 References

Relation no.	Source	Variable and variable relation
For schedule 7:2		
1	Tö	(1A/1B - 2 - 5 - 7) , (8 - 7) , (6 - 9 - 13) , (1A/1B - 10 - 9 -13)
	Tr	(1A - 2 - 5 - 7 - 11 - 13) , (1A - 2 - 3 - 8)
	Fu	(1A/1B - 2) , (6 - 9) , (1A/1B - 4 - 10 - 9) , (1A/1B - 12 - 10)
	M	(1A - 3)
	Fo	(1A/1B - 5) , (1A/1B - 6)
2	Tö	(1A - 2 - 4) , (6 - 9 - 11)
	Tr	(1A/1B - 2 - 3 - 5) , (6 - 9 - 11)
	Fu	(1A/1B - 2 - 4 - 6 - 9 - 11) , (1A/1B - 2 - 3 - 5 - 7) , (7 - 3) , (1A - 10 - 11) , (1A - 8 - 11) , (3 - 8)

3	Tr	(1 - 2 - 4) , (1 - 3 - 4)
	Fu	(1 - 2 - 4)
4	Tö	(1A/1B - 2 - 4) , (1A/1B - 5) , (12 - 13) , (20 - 24)
	Tr	(1A - 6 - 22 - 24) , (1A - 2 - 4 - 8 - 24) , (2 - 9 - 15 - 24) , (4 - 15) , (15 - 16 - 24) , (2 - 10 - 17 - 16) , (9 - 24) , (13 - 24) , (1A - 3 - 7 - 14 - 23 - 24)
	Fu	(1A - 2 - 4 - 15 - 24) , (1A - 6) , (1A - 5 - 12 - 21 - 24) , (2 - 10 - 17 - 18 - 24) , (2 - 11 - 19 - 24)
	SW	(1B - 5 - 20 - 24)
5	Tr	(1 - 3 - 2 - 5) , (1 - 4 - 5)
6	H	(1 - 2 - 3 - 5) , (2 - 4 - 5)

For schedule 7:3

7	Tö	(1A/1B - 2 - 4)
	Tr	(1A - 2 - 4)
	H	(1A/1B - 2 - 3 - 4)
	M	(1A - 2 - 3)
	Fu	(1A/1B - 2 - 3 - 4)
8	Tr	(1A - 3 - 5)
	Fo	(1A/1B - 3 - 5 - 10) , (1A - 6 - 10) , (1A - 8 - 10)
	Fu	(1A/1B - 2 - 4 - 10) , (1A - 6 - 10) , (1A - 7 - 10), (1A - 9 - 10)
9	Tö	(1 - 2 - 3 - 5 - 6) , (1 - 4 - 6)
	H	(1 - 2 - 3 - 5 - 6)
	Fu	(1 - 2) , (1 - 4 - 6)
10	H	(1A - 2 - 4) , (1B - 3 - 4)
	SW	(1B - 2)
11	SW	(1 - 2 - 4) , (1 - 3 - 4)
12	Tö	(1A/1B - 2 - impl.[1/] 15 - 18) , (1A - 3 - 7 - 11 - impl. 15 - 18)
	Tr	(1A - 11) , (1A - 3 - 7 - 11)
	Fo	(1A/1B - 9 - 13 - 15 - impl. 18)
	M	(1A - 5 - 10 - impl. 17 - impl. 18) , (1A - 2) , (1A - 6 - 14 - impl. 18)
	Fu	(1A/1B - 3 - 4 - impl. 18) , (3 - 7) , (3 - 12 - 15) , (3 - 8 - 16 - impl. 18)

1/ "impl." means that I consider the relation to be implicit in the author's presentation.

For schedule 7:4

13	Tö	(1 - 2 - 4 - 8 - 11 - impl. 16) , (1 - 9 - 12 - 16)
	Tr	(1 - 2 - 4 - 8 - 11 - 13 - 16) , (1 - 14 - 16)
	Fo	(1 - 4) , (1 - 5 - impl. 16) , (1 - 6)
	M	(1 - 6 - 16) , (1 - 7 - impl. 16)
	Fu	(1 - 10 - impl. 16) , (1 - 3 - 15 - 16)

For schedule 7:5

14	Tö	(1A/1B - 2) , (1A/1B - 4 - 10 - 16)
	Tr	(1B - 15 - 16)
	Fu	(1A/1B - 4 - 9 - 10 - 14 - impl. 16)
	H	(1A - 2 - 6 - impl. 16)
	M	(1A - 3 - 8 - impl. 16) , (1A - 15 - 16)
	J	(1A - 7 - 12 - impl. 16)
	C	(1A - 3 - 8) , (impl. 1A - 5 - 12 - impl. 16) , (impl. 1A - 7 - 11 - impl. 16)
	DR	(1A - 13 - impl. 12 - impl. 16)
15	DR	(1A - 7 - 2)
	SW	(1A/1B - 7)
	Fu	All other relations. All relations with 15 are implicit.
16	Tr	(1 - 2 - 16 - 17) , (1 - 2 - 4 - impl. 9 - impl. 17) , (1 - 11 - 15 - impl. 17)
	Fo	(1 - 9 - impl. 17) , (1 - 5 - 10 - impl. 17)
	Fu	(1 - 2 - 7 - 12 - impl. 17) , (1 - 3 - 8 - impl. 17) , (3 - 14 - 9) , (3 - 14 - impl. 17) , (3 - 4) , (1 - 2 - 4 - 10 - impl. 17) , (1 - 5 - impl. 17), (1 - 5 - 10), (1 - 6 - 11 - impl. 17)
	Ho	(1 - 13 - impl. 17)

For schedule 7:6

1	H	(1 - 5 - 6 - 8) , (2 - 6 - 8) , (3 - 6 - impl. 8)
	SW	(4 - 6 - 8)
	Ho	(4 - 7 - 8)
2	H	(1 - 2 - impl. 3)
	K	(2 - 3)
3	K	(1 - 4 - 5 - 6)
	Fu	(3 - impl. 5 - impl. 6) , (2 - 4 - 3)

4	K	(1 - 3 - 5) , (2 - 3 - 5)
	Fu	(4 - 5)
5	G	(1 - 3 - 5)
	M	(2 - 5)
	Fo	(4 - 5)
6	Tö	(1 - 2 - 3)
7	DR	(1 - 4) , (2 - 3 - 4)
8	Fu	(1 - 2)
9	Fu	(1 - 3)
	Ho	(2 - 3)
10	Fo	(1 - 3 - 5) , (1 - 4 - 5)
	Fu	(1 - 2 - 5)
11	Fu	(1 - 2 - 4)
	DR	(1 - 3 - 5)
12	K	(1 - 2)

APPENDIX 8:1 RELATIONS STATED BY INTERVIEWEES BETWEEN CHANGES IN DECISION INTEGRATION AND EFFICIENCY IN THE STUDIED SYSTEMS

According to the original plan for this study two types of data were to be collected: (a) measures of efficiency criteria referring to the systems as a whole, and (b) indications of changes in efficiency criteria which appeared to be the result of conscious, realized changes in the execution and/or decision integration of a particular activity.

It proved difficult to establish any general measures of efficiency, and in the final version of my plan I abandoned the attempt. The few measures that could be established have not been reported here.

Only in exceptional cases was it possible to register any definite indications of changes of type (b). In almost all cases, I had to be content with a subjective indication of the effect of integration changes. The questions on which these evaluations were based can be seen in the interview guide, section 9.

With a few exceptions, officials at CC were responsible for the answers reported below. Naturally most of the relations stated were positive. To begin with, it is unlikely that changes in integration would be introduced if their effect on efficiency were expected to be negative. Furthermore, most of my respondents were at least partly responsible for the decision to introduce changes. In view of the lack of any objective measurement technique, they were therefore likely to assume that their expectations of improvements had been realized. The data in appendices 8:1 and 9:1 must be judged in light of this.

Among the integration changes are some that refer to the large system, and to wholesale activities. In defining DI for wholesale activities in the large system, CC at the higher level represents the controlling and CC on the lower level the controlled component.

Schedule A 8:1 Stated Relations Between Changes in Decision Integration and Efficiency

When an activity has the same name on both levels, R indicates the retail and W the wholesale activity.

Activity	Change in Efficiency	System[1/]	Description
1. Choice of assortment (R) Choice of assortment (W)	Greater efficiency in decision process	FII PII-R PII-W	The introduction of the "national assortment" in FII led to greater DI in the large system in choice of assortment at both levels. The greater and more specialized resources that could be used in individual product decisions, with consequently more reliable and up-to-date information, led to "better" decisions. In the PII systems the change towards greater DI (in PII-W only in the retailers' choice of assortment, and not for the large system) took place more slowly and without the same organizational changes being noted as in FII.
2. Choice of assortment (R)	Less efficiency in decision process	FII	Earlier attempts by CC_{11} to increase the intended DI to "identity" had been difficult to administer. The idea had been that RC should follow assortment lists drawn up by CC_{11}. Continuous changes in the assortment available to CC_{11} were the cause of the difficulties. Later DI was again reduced.
3. Choice of assortment (R) Sales promotion	Higher degree of coordination	FII	Higher DI (introduction of "national assortment" and centralized sales planning) in choice of assortment and SP (identity of article), means better mutual adjustment between these activities. For instance, sales of new articles in the national assortment can be better supported by SP activities in the introductory stages, and SP articles rarely disappear from RC's assortment soon after an SP campaign.
4. Sales promotion	Greater bargaining strength in acquisition of material	FII	Greater extent of CC_{13}-planned SP means that, to a greater extent than before, decisions about the production of store material can be made in time to utilize printers' off-season capacity at lower costs.
5. Sales promotion	Greater efficiency in decision process	PII-R PII-W NII	The introduction of centrally planned sales promotion (especially the "weekly activities") meant that the total SP activity was greater than before.

1/ Note that these are the systems where such a relationship was said to have been observed. Thus, other systems may have experienced the same relations, but these were not registered either because no integration-affecting action had been taken recently enough, or because the interview was incomplete, or because the respondent thought the relation too vague to specify, etc.

Schedule A 8:1 (cont.)

6. Pricing Sales promotion	Higher degree of coordination	FII	The merging of the local societies led to the cessation of internal competition (prices, SP) in the system.
7. Sales promotion	Greater efficiency in decision process	PII-R	CC has a better decision base than RC for choice of assortment and pricing in SP, which makes the activity more efficient from the point of view of revenues when there is an increase in the DI.
8. Sales promotion	Less efficiency in decision process	FII	The system of assigning SP articles to RC without the latter being able to stipulate quantities has been adjusted, since it was felt that RC's sense of responsibility for the storing and selling of SP articles had suffered.
9. Sales promotion Storing (W)	Higher degree of coordination	PII-R	RC's earlier ordering of SP articles makes it easier for CC to avoid storing too much, or too little, of SP goods.
10. Price marking	Greater efficiency in decision process	FII	Considerable savings have been made since the change-over to a new price marking technique (recommended by CC_{11} after work studies by CC_{13}).
11. Establishing stores	Greater efficiency in decision process	PII-R	Investigations and surveys at CC provide a better decision base than if every RC has to acquire and analyse the necessary information before a new store can be established. Experiences gained in the system can be used in central planning.
12. Acquisition of managers (R) Acquisition of other personnel (R)	Greater bargaining strength in acquiring personnel, greater efficiency in decision process	FII	Since the merger, it has been easier to recruit personnel, perhaps because larger organizations have greater powers of attraction. It has also been easier to transfer personnel within the system, so that resources are better utilized.
13. Acquisition of managers	Greater efficiency in decision process	PII-R	When CC chooses store managers, it is more likely than before that recruitment will be geared to proven skill than to the individual's economic standing.
14. Unspecified retail activities	Lower costs in the decision process	FII	The merger of the many small cooperative societies led to a decrease in administrative costs as a percentage of sales.
15. Unspecified retail activities	Greater efficiency in decision process	FII	The merger also meant larger and more specialized resources in the decision process. This meant higher-quality information in the decision base at CC and RC.

Schedule A 8:1 (cont.)

16.	Unspecified retail activities	Less efficiency in decision process	FII	One respondent in RC felt that the merger had made it more difficult to make efficient decisions, because the channels of information between CC and RC had become longer and a lot of bureaucratic paperwork had been introduced.
17.	Ordering (R) Order-picking (W)	Higher degree of coordination	PII-R	Since RC's ordering now took place a day earlier, CC could note a 20 % saving in manpower for order picking as a result of the more regular and greater utilization of capacity in this activity.
18.	Goods receival (R) Out transport (W)	Higher degree of coordination	PII-R	Transport activity now much more efficient than 4-5 years ago. Probably due mainly to better adjustment between the timing of goods receival at RC and CC's need to use capacity at a regular, high rate. Greater DI favors this.
19.	Establishing stores	Higher degree of coordination	FII PII-R	The merger in FII, and the increase in CC_{22}'s participation in the decision process in PII-R, have meant that, in establishing stores, total internal resources are now better allocated to favor total efficiency. It has also been possible to check how the new establishments have affected other RCs in the system. In PII-R the increase in internalization and exclusiveness (a smaller proportion of stores new to the system are established outside the system) has also affected the increase in efficiency.
20.	Establishing stores and other retail and wholesale activities	Higher degree of coordination	PII-R	More than before, CC can influence decisions about new establishments (with given location and size) so that the different dimensions of the activity (e.g. layout, goods receival, assortment, inventory) can be better adapted to certain wholesale activities (e.g. order picking, out transport) or certain retail activities so as to favor efficiency in the system as a whole.
21.	Establishing wholesale units Closing down wholesale units	Higher degree of coordination	FII	Studies of the establishing and closing down of wholesale units apply to the large system.

APPENDIX 9:1 RELATIONS STATED BY INTERVIEWEES BETWEEN CHANGES IN EXECUTION INTEGRATION AND EFFICIENCY IN THE STUDIED SYSTEMS

General comments applying to this appendix can be found at the beginning of appendix 8:1. Note that some of the integration changes refer to the large system. No definitions of the EI concepts for the large system were given in chapter 6, but the definitions are analogous. The activity transference of wholesale activities in the large system refers to transference to a higher CC level; homogeneity refers to a comparison between CCs on the same level.

Schedule A 9:1 Stated Relations Between Changes in Execution Integration and Efficiency

Activities and EI variables	Changes in efficiency	System[1/]	Description
1. Activity transference: Choice of suppliers(W) Homogeneity: Choice of suppliers(W)	Lower purchase prices	FII PII-R	Negotiations with suppliers to wholesale units have, with a few exceptions, been completely transferred to the CC_{13} level in FII, and to a great extent to the CC_{23} level in PII-R. Together with the increased homogeneity in choice of suppliers (identity) between wholesale units in the large system, this has meant better opportunities for getting lower purchase prices.
2. Homogeneity: Choice of assortment (R) Homogeneity: Choice of assortment (W)	Lower wholesale storage costs	FII	The introduction of the "national assortment" led to an increase in homogeneity in both retail and wholesale choice of assortment (identity) and to a reduction in the number of articles in each wholesale unit. CC estimates that the wholesale storage turnover rate has increased by 35 % and that, as a result, 20 million crowns tied-up capital in the large system has been freed. Structural changes in the number of wholesale units have probably contributed to this development.
3. Internalization: Selling/order receival	Lower purchase prices	FII	The large system's high DI for choice of assortment in retail and wholesale units (depending partly on the "national assortment") can be used as an argument in supplier negotiations, since selling in retail and wholesale units is not (and should not be) carried out by the supplier. Thus we can say that internalization has increased in this activity.

1/ See footnote p. 315.

4.	Homogeneity: Pricing	Lower costs in decision process	FII	The no. of cases of price differences between price zones in the large system has dropped, reducing the costs of data processing.
5.	Homogeneity: Choice of assortment (R) Homogeneity: Pricing	Lower revenues	FII	One respondent (in RC) said that he had noticed a drop in sales resulting from the greater homogeneity. Since the merger it had been more difficult to adapt choice of assortment and pricing to local conditions.
6.	Homogeneity: Choice of suppliers (R) Activity transference: Choice of suppliers (R)	Lower purchase prices	FII	Since the merger there has been greater homogeneity in the identity of external suppliers to RC. The change in the location of such supplier negotiations from the many small societies to CC_{11} can also be seen as an increase in activity transference. These changes in integration have meant better conditions for buying from external suppliers.
7.	Activity transference: Choice of suppliers (R)	Lower purchase prices	PII-W	CC_{31}'s supplier negotiations with "cooperating" suppliers have meant group rebates on combined purchases of all RCs.
8.	Activity transference: Sales promotion	Greater efficiency in sales promotion	PII-R PII-W	Centralized advertising and production of store material has meant scale economies; execution costs are lower at given information flow, and the quality of the execution improves.
9.	Activity transference: Sales promotion	Lower purchase prices	PII-R PII-W NII	Centralized negotiations with suppliers about buying terms etc. for SP articles have resulted in lower purchase prices.
10.	Homogeneity: Sales promotion	Less efficiency in sales promotion	PII-R	The high homogeneity between RCs for CC-planned SP, which from some points of view is necessary and beneficial, also has some disadvantages. If RC initially has a very heterogeneous assortment, then the introduction of a common SP program may mean an undesirable deepening of the assortment and/or an SP activity not well adapted to local conditions. Very high homogeneity may also mean that RC has less room for its own non-CC-planned SP.
11.	Homogeneity: Sales promotion	Higher revenues	PII-R	The introduction of very homogeneous SP has probably had a favorable effect in competition with other systems with high homogeneity for SP and a "group image".

12.	Homogeneity: Payment routine (purchases) (R)	Lower costs	PII-W	The new payments system (automatic giro) means less costs at CC for checking credit payments and, because of greater homogeneity in timing, better opportunities for planning CC's liquidity. This means lower costs for coping with unexpected changes in liquidity.
13.	Activity transference: Prepackaging	Lower costs	PII-R	More centrally prepacked perishables means better utilization of scale economies in this activity. More effective machines, longer runs.
14.	Homogeneity, Activity transference: Price marking	Lower costs	FII	The greater homogeneity between the price zones in the large system have led to savings in the price marking of perishables at CC_{12}.
15.	Activity transference: Establishing stores	Greater bargaining strength in acquiring store premises	PII-R	Since CC has increasingly - at the present time almost entirely - taken over negotiations with property owners etc. about new sites, the system has a stronger position in competition for these as a result of CC's size and goodwill.
16.	Activity transference: Acquisition of capital (R)	Greater bargaining strength	PII-R	Greater participation by CC in acquisition of capital from external sources has made acquisition more efficient on account of CC's size and goodwill. Establishment of new stores becomes easier; this has a positive effect on the market share. Capital costs can also be affected favorably.
17.	Homogeneity: Establishing stores	Lower purchase cost of material	PII-R	It has been possible to make the acquisition of material for new stores more uniform, which has meant greater quantities per article and lower purchase prices.

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List of Frequently Used Symbols

Symbol	*Introduced on page*	
RC	14	*Retail Component* i.e. a store
RC_i	49	*Retail Component* in system *i*
CC	14	*Central Component* i.e. one or more wholesale and/or administrative units
CC_{ij}	49	*Central Component* in system *i* on the j^{th} level in the hierarchy of central components
II	46	*Institutional Integration*
DI	58	*Decision Integration*
EI	102	*Execution Integration*
FII	47, 48	Symbol for system with *Full Institutional Integration*, also for *System 1* in the empirical study
PII	47, 48	Symbol for system with *Partial Institutional Integration*, also for *Systems 2 and 3* in the empirical study
PII-R	47, 48	Symbol for system with *Retailer-Sponsored Partial Institutional Integration*, also for *System 2* in the empirical study
PII-W	47, 48	Symbol for system with *Wholesaler-Sponsored Partial Institutional Integration*, also for *System 3* in the empirical study
NII	47, 48	Symbol for system with *No Institutional Integration*, also for *System 4* in the empirical study
D	58	The *Chosen Set* i.e. a description of the attributes of the chosen action alternative
C	58	The *Controlling Set* i.e. a description of the attributes of action alternatives included in the control information
T	58	The *Total Set* i.e. the set of elements describing all possible action alternatives

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