INFORMATION MANAGEMENT IN PROFESSIONAL ORGANISATIONS

ALTERNATIVE APPROACHES TO THE APPLICATION OF INFORMATION SYSTEMS IN PROFESSIONAL ORGANISATIONS

BY

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ABSTRACT

This research aims to examine the influence of the use of information technology on professional organisations and to identify which policies could be followed by the management of such organisations to apply information systems.

Traditional approaches to information technology assume that organisations operate as 'machine bureaucracies' - a top down management style, standardisation of work processes and a high level of interdependency amongst departments. Such assumptions are not relevant to professional organisations. In these organisations professionals perform and control the primary process of the organisation in close interaction with their clients and with a high level of autonomy. With the rise of computers and information technology, such organisations are confronted with the question of how to apply this technology, since conventional models may not be appropriate.

The strategy used to accomplish the research objectives was the case study metho-dology, complemented by a literature study. Two hospitals were chosen as case sites, since hospitals are generally perceived as typical examples of professional organisations which make intensive use of information technology. Interviews and conversations with personnel, observations and hospital documents were the main sources for the case studies.

This research indicates that four general strategies can be followed which are captured in a model which is developed throughout this study namely the Professional - Heteronomy model. First, information technology can be utilised by making the support activities more efficient, e.g. by using computers for administration and other office activities, without affecting the professionals directly with such technology [this may imply that professionals develop and use their own information systems relatively autonomously]. Second, information technology can be used for the direct support of professional activities. In this

case, the primary goal is to motivate professionals and to help them to improve their work and their level of professionalisation. A third direction might be to use this technology with the objective of substituting professionals by computers, thus reducing the number of professionals needed. Cutting costs or improving services are management motives for introducing such a policy. The fourth direction is to use information technology for management support. This can be practised by deriving management information from data gathered from the primary process. The management may obtain the information to manage and to control the organisation in a more direct and tight way through these systems.

A major conclusion is that the states of computing management model (Kraemer et al., 1989) is a useful framework to categorise the state of computing in professional organisations, as well as being a tool to model changes of these states. The study proposes some adaptations to this model in order to make it more refined: in the adapted version the model can reflect several states at the same time. This will be a more realistic representation of computing in many cases.

This study also observed in both case study sites what we term multiformity in computing: in other words, various actors influenced decision making with respect to information systems in apparently contrasting ways. The study proposes that a more conscious management of 'multiform computing' may be a more realistic alternative to the uniform approaches which are common.

TABLE OF CONTENTS

LIST OF FIGURES

ACKNOWLEDGEMENTS

AUTHORS' DECLARATION

This study embodies the result of my own special work and has been composed by myself. The following three articles, which cover parts of this study, were published before:

1 "Politieke aspecten bij de ontwikkeling van informatiesystemen" (1991). [Political Aspects Surrounding the Development of Information Systems, in Dutch]. *Informatie*, 12, 857-64;

2 "Informatiesystemen en organisatieverandering, een gevalsstudie" (1992). [Information Systems and Organisational Change, a Case Study, in Dutch]. *Bestuurlijk Informatiekundig Magazine*, 3, 8, 3-7 and

3 "Strategieën voor informatiemanagement bij professionele organisaties" (1994). [Strategies of Information Management in Professional Organisations, in Dutch]. *Informatie*, 36, 5, 333-42.

Section 3.2.4 of this study led to a joint article with Han G. van Dissel. The title of this article is:

"Fasen en automatisering: betekenis en beperkingen van Nolans fasenmodel" (1992). [Stages and Automation: Meaning and Limitations of Nolans Stages Model, in Dutch]. *Informatie*, 34, 9, 503-11.

This article was also published in the Management Report series (no. 114) of the Rotterdam School of Management, Erasmus University, Rotterdam, The Netherlands.

CHAPTER 1

INTRODUCTION

1.1   OVERVIEW

This study discusses the management of information and computing in professional organisations. The experiences and the practice in two of such organisations will be described and confronted with assumptions from theory. The descriptions will be analysed, partially through applying the descriptions into some models which are known from the information management literature. The result of this study will be: 1) two descriptions with respect to the practice of information management in professional organisations, 2) an analysis of these descriptions from different viewpoints, 3) an assessment of the models which are used for the analysis and 4) concluding remarks with respect to the management of information systems and computing in professional organisations which may help the management of such organisations to manage information in a way which takes account of the specific type of organisation. The analysis and the concluding remarks are specifically directed to the question of the alternatives available for utilising information technology. Various general directions of the use of information systems (IS) will be described in order to offer the management of professional organisations a framework which may help them to discuss strategic alternatives with respect to the utilisation of information systems. By *strategic alternatives* is meant: various possible ways of utilising information systems which may advance the interests of the organisation as a whole and/or of a specific group of stakeholders.

Information Management in Professional Organisations is a managerial study. The focus will be on organisational and managerial aspects rather than on the technical dimension of information systems and computing in organisations. This work originated from various activities in which the writer has been involved. As a lecturer, researcher and adviser in the field of management and business information systems I wished to

deepen and broaden my knowledge and insight into the relation between organisation and information. I regularly observe a gap between information specialists and computer specialists on the one hand and managers and organisational thinkers on the other. Different schools of thought, different paradigms (Morgan, 1986; Hirschheim and Klein, 1989; Kendall and Kendall, 1993) and different perceptions can be observed; this gap is not always easy to overcome. Improved insight into the relation between the characteristics of information systems and their organisational consequences may contribute to narrowing this gap. I believe that it is essential for designers of information systems, for users and for managers of organisations to know the characteristics of information systems and to have insight into the possible organisational consequences of information technology.

1.2   PROFESSIONAL ORGANISATIONS

The focus will be on professional organisations (Etzioni, 1964) also called professional bureaucracies (Mintzberg, 1979a, 1983a). This is the kind of organisation

> 'that relies for coordination on the standardisation of skills and its associated design parameter, training and indoctrination. It hires duly trained and indoctrinated specialists -professionals- for the operating core and gives them considerable control over their own work' .. 'control over his own work means that the professional works relatively independently of his colleagues, but closely to the clients he serves' (Mintzberg, 1983a, p. 190).

Several characteristic features can be mentioned of this kind of organisation. Among these are:

- coordination takes place by standardisation of skills (the worker rather than the work or the output are specified);

- highly educated professionals at the basic level of the organisation are the key part of the organisation;

- the organisation relies on their skills and hires trained and indoctrinated specialists for the operating core, giving them considerable control over their own work;

- their work is highly specialised in the horizontal dimension (Mintzberg, 1983).

Because of this, the professionals in the operating core have considerable power: the power of expertise;

- the (often large) support staffs of professional bureaucracies often work as a machine bureaucracy (in Mintzberg's terms, Mintzberg, 1979a, 1983a) and consequently show these characteristics. The environment of professional bureaucracies is often relatively stable.

Because of these specific characteristics, a number of authors have distinguished this kind of organisation, common in health care, law, education, consultancy, social work and research from other kinds of organisations. The term professional and professional organisation will be explained and defined more extensively in chapter 2. The work of some influential writers in this field will be explained when they discuss the professional organisation in contrast with other kinds of organisations. Some of their assumptions -especially the assumptions with respect to the use of information systems- will be made more explicit.

In order to keep this study manageable, I have decided to focus the case studies specifically on hospitals -generally perceived as professional organisations- and to generalise these observations to other professional organisations and to organisations in general in the analysis and conclusions chapters.

In this section, two questions will be discussed. Firstly: *what is the basis for the choice for professional organisations?* and secondly: *why are professional organisations expected to be different from other organisations with respect to information management?* These questions are discussed below.

1 What is the basis for the choice for professional organisations?
A number of different motives explain the choice of this specific kind of organisation. These are described below.

Professional organisations are increasingly significant in the economies of many western countries. Professional organisations are often suppliers of services such as education, health care, advice, jurisdiction and leisure. In many cases, professional organisations offer knowledge, expertise and experience to their customers. The service sector in western countries is increasing to more than 50 percent of all jobs; this can be seen as an indicator of professional growth. However, it is important to mention that a service-supplier is not necessarily a professional organisation and that some manufacturing organisations -especially the craft enterprise- can be professional organisations as well (Mintzberg, 1983a). The expenses for health care and education (these are services which are often supplied by professional organisations) are increasing and constitute more than 20 percent of the national income of most developed countries. Raelin (1991, p. 13) asserts that in the U.S.A. professionals were approaching 16 percent of the civilian labour force in 1990 (up from 8.4 percent in 1950) and that some projections have forecast a proportion of 20 percent in the 1990's. The suggestion is that professionals will occupy a central position in service-supply because the emphasis will be more and more on creative insight and imagination rather than on mechanical and impersonal habits.

Many information management studies have been carried out in non-professional organisations. Most approaches and models for information management and information planning (some are described in chapter 3) are based on empirical research in large manufacturing organisations. They apply a consistent top-down planning approach in order to design a hierarchical information architecture (Pruijm, 1990; Waes, 1991). These approaches assume standardised work processes which have to be managed by a tight top down hierarchy. Information systems can improve operational efficiency and functional effectiveness in this way. Nolan (1979) predicts in his growth-model a tendency towards integration of information systems and a central data-administration. He assumes in his well-known model an industrial and functional structured organisation. Is it possible to apply these industry-based approaches in

professional organisations without limitations? This study attempts to answer this question by analysing their approaches and suggesting some alternative approaches in chapter 3, and by applying various models in the later chapters.

Information-technology is increasingly applied in professional organisations. Section 1.5 sketches the historical development of the thinking with respect to information management. In this section more clarity will be given to the fact that, nowadays, information technology can be used in various ways in nearly every kind of organisation. The management of professional organisations is confronted with the decision problems as to whether and how these new possibilities (some will say opportunities) can be used. One can choose to use information technology only to support the data-processing functions in order to make these processes more efficient. But it may also be possible to measure the performance of the support staff and the professionals. It may be another choice to use information technology primarily to provide the management with more useful management information. In other words: the origination of the use of information technology in professional organisations confronts the management of such organisations with many questions related to the possible application of information systems. Knowledge about the deeper meaning of certain information systems in organisations and knowledge with respect to the intended functioning of the organisation make it easier to anticipate these opportunities. A report of the Butler Cox Foundation in 1987 stated in this context:

> 'Information technology has an important role to play in professional bureaucracies by providing the tools and systematic controls for the support services to function efficiently and, where appropriate, by providing an analytical tool to support the professionals. Many professionals, especially the older ones, will be reluctant to use information technology to support their work. Their professional status is based on the expert use of the tools they were trained to use, and they have a deeply rooted resistance to change' (p.17).

These far-reaching suggestions are strongly related to the focus of this study and will be discussed in more detail in subsequent chapters.

Information management in professional organisations has not been studied previously in this context. It has already been emphasised that many information management models assume a kind of a machine bureaucracy (Mintzberg, 1983a), often embodied by large manufacturing companies or an impersonal data processing organisations like (parts of some) ministries and insurance companies. There are reasons to suppose that the management of professional organisations will be confronted with specific questions and problems if they try to introduce new information technology. These reasons (assumptions) will be laid out in the next part of this section.

A more personal motive for the choice to study professional organisations is that the author works in such an organisation and has contacts with other professional organisations. This explains the interest in this kind of organisation.

2   *Why are professional organisations expected to be different from other organisations with respect to information management?*

A number of reasons imply the expected difference with respect to this field of management.

The general management in professional organisations functions in a different way from the management in other organisations. The most important item is the dispersed rather than concentrated power in professional organisations. Many professional organisations have a decentralised and collegial structure; professionals are often only subject to the collective control of their colleagues, who have the right to censure for malpractice (Mintzberg, 1983a). Professionals expect to have control over their own work and the decisions that affect it; their expertise and their specific training gives them considerable (expert)-power. They do not allow much control; standardisation and supervision over their work which is often said to be too complex or too specialised to control. Professionals are used to enjoying considerable autonomy

and have the tendency to use the resources of the organisation in order to manage their own 'shop'.

All these suppositions are elaborated and discussed more extensively in chapter 2 and explain the relevance of the central question. Professional organisations often have large support staffs which are managed more like machine bureaucracies (ibid.). These support staffs have the task of supporting the (often expensive) professionals so that they can work in the most efficient way. The support staffs are mostly managed tightly from the top. The tasks of managers in professional organisations are according to Mintzberg (ibid.): 1) to handle disturbances, 2) to serve key-roles at the boundary of the organisation, between the professionals inside and interested parties on the outside and 3) to manage the (often large) support-staff effectively.

Assuming that the (tasks of the) general management differ significantly in professional organisations, information management may be different too.
The specific characteristics of professional organisations as mentioned earlier in this chapter imply certain (logically derived) consequences for the use of information technology in such organisations.

1 Professionals are accustomed to controlling their own work; they will not easily allow administrators to implement information systems which control their work-performance more tightly. Mintzberg (ibid.) asserts:

> 'The professional resists the rationalization of his skills -their division into simply executed steps- because that makes them programmable by the technostructure, destroys his basis of autonomy, and drives the structure to the machine bureaucratic form' (p. 203).

For this reason, we may expect a power-struggle between professionals and management when administrators try to implement information technology (IT) based control systems (which were not technically possible in the past) in order to measure the work performance of the professionals. Fitter (1987) stated:

> 'it is very unlikely that such professional groups as doctors would support its adoption' (p. 106).

2   Information technology can be used to improve the effectiveness, the work-performance and the satisfaction of professionals, and it may be used in this way in many cases. Many professionals shall try to create their own tailor-made work environment, which may include the possibilities which information technology offers. They do not want to be obliged by the administrative structure to use new technologies; the professionals expect to be provided by the management with information technology possibilities so that they may use it if they wish.

3   Professionals want to control their own work and do not accept prescriptions how to do things from the so called support staffers. The professionals will be supported by them on their own request and as a service. The information-systems (IS) staff is also a support part in a professional organisation. If this IS-staff has the attitude to serve and support the professionals with the IT-resources which are demanded, problems will not arise. But if the IS-staff develops a professional-independent policy with many rules, restrictions, prescriptions, procedures and not-discussed purchases which have to be used, tensions between the professionals and the IS-support staff may be expected.

4   When the support staff is large and important in a professional organisation and managed as a machine bureaucracy, information systems with a control aim can be expected in this part of the organisation (Butler Cox, 1987).

1.3   CENTRAL QUESTION OF THE RESEARCH

The central question of this study is whether the specific characteristics of professional organisations influence the use of information systems in such organisations and which alternative approaches of using IT can be distinguished in this context. This question is addressed by answering the following questions.

1   What is information management?

2   What are professionals and what are professional organisations in contrast with other kinds of organisations?

3   What is the expected relation between the use of IT and professional organisations?

4   What are current approaches to information systems management issues?

5   What is information systems policy like in practice in professional organisations? Why is it carried out in that way?

6   Which alternative approaches can be distinguished in practice and which implications do they have?

7   Can the described practice be relevant to theoretical approaches to information management and to managers and practitioners in professional organisations?

The first question will be discussed in the next section. In section 1.4, the basic concepts relevant in this study are defined. Questions 2 and 3 will be discussed in chapter 2. The terms professionals and professional organisations will be explained and there will be tried to formulate expectations with respect to the relation between information (policy) and professional organisations. Chapter 3 deals with the fourth question. Previous work in the field will be explained and discussed. Some well-known models which are drawn from literature will be presented and their assumptions analysed. These models will be compared with alternative approaches based on a different concept of what organisations really are. The assumptions of the approaches discussed will be used to analyse the observations of the case studies, which will be presented in subsequent chapters. Chapter 4 deals with methodological issues: the research design, the case study methodology and the site-selection. Chapters 5 - 7 contain the descriptions of case studies in two different organisations. These descriptions attempt to answer questions 5 and 6. Chapters 8 and 9 deal with the questions 6 and 7. In chapter 8, the observations of the case studies will analysed, and in chapter 9, conclusions will be drawn here and recommendations for further research in this field will be advised.

1.4   DEFINITION AND GLOSSARY OF KEY-WORDS

It is not easy to give exact definitions of the main terms used in this work; words such

as management, information, policy and organisation are often described by others in various ways, but by the advancement of research and practice, most descriptions seemed not always free from discussions, misunderstandings and discussions of different schools. It is not the intention to contribute to these disputes in the following section; here is tried to escape from this by using simple and operational definitions and by sketching definitions by giving examples.

Information management is increasingly recognised as a distinctive managerial discipline. This has particularly been the case since the wider use of computer technology drastically changed the organisational landscape. The advent of this new technology demanded an active attitude on the part of the general management of organisations in order to support this process in the most effective way. This discipline is called information management and not computer management; it is not the computer that is the key-issue, but the delivery of the right information at the right place at the right time at minimal cost. It is hard to define information management in terms which are completely disconnected from information technology and computers. Sometimes, this activity is carried out in a computerised way, sometimes in a manual way. So we can define information management as:

> 'the discipline of managing an organisation's information resources (including *information technology (IT)* applications) in such a way as to facilitate and control its information supply' (after Waes, 1991).

In many cases, information management is explained as the daily practice of these activities, the *managerial action* (Kraemer et al., 1989), while information policy is explained as the official and explicit statements of the organisation. In nearly all large organisations, conscious or unconscious information management is carried out; information policy is not so widespread in practice according this definition (Brancheau and Wetherbe, 1987). Information management, the daily practice of managerial action in relation to information issues, will not necessarily correspond to the official information policy.

As in any other form of management, we can distinguish a set of sub-tasks in information management (after Earl, 1989 and Waes, 1991). Among these are commonly mentioned: 1) *strategy formulation*, the determination of the main lines along which information supply and IT need to develop in the organisation, 2) *planning* - the forecasting of future trends, and dealing with the expected developments by setting targets and defining ways and means for reaching them, 3) *implementing and organising* - creating effective relationships between people in an organisation and the tools they use, resulting in an organisational structure and 4) *control* - checking whether the activities carried out in the organisation are in accordance with planning, and devising means of correcting or otherwise dealing with any observed differences between planning and reality. Accordingly, information management deals with questions such as:

- which information systems have to be developed?
- do current and prospective systems have to be integrated?
- what will be the organisational position of the information-systems (IS)-department? How can this department be integrated into the organisation as a whole? What will be the role of the IS-department in the future? What kind of skills/people are needed?
- is it possible to gain competitive advantage by information-technology? How?
- how can information policy be integrated into organisational policy?

(based on Brancheau and Wetherbe, 1987).

Figure 1.1 lists more recurring and new information management questions according to Earl.

ACTIVITY	RECURRING QUESTIONS	'NEW' QUESTIONS
Planning	What systems should we develop next? Which of our many application needs/has priority? What is the next hardware step?	What information systems do our current business strategies demand? What strategic opportunities are presented by IT? Do we need a telecommunications policy?
Organisation	Should DP be centralized or not? How do we improve/use specialist relations? How can we secure top management support?	How will IT affect our organisation structure? How can we find more capable IT personnel? Should we have an IT director?
Control	How much should we be spending on DP? Are we getting value for money from DP? Should we charge out all DEP services?	How much are we spending on IT? How can we evaluate IT? How can we manage large IT projects?

IT = Information Technology
DP = Data Processing

Figure 1.1   Examples of information management questions (Earl, 1989)

Managers in professional organisations may ask specific questions (beside these general questions) in relation to their information management. Examples of such questions with respect to planning are:

- how can information technology be used to to make more effective use of the professionals?

- how can information technology be used to motivate the professionals?

- how can information technology be used to improve the (often knowledge-based) products which are offered to customers?

- how can information technology be used to derive management information?

- is it possible to increase grip and the insight of management into the organisation by using information systems?

With respect to the organisation they are:

- what is the best organisational relation between the IS-department and the professionals?

- how can professionals be involved in the information policy?

With respect to control they are:

- is it possible to evaluate the support systems of the professionals?
- how much should be spent on support systems for professionals and how much on control systems?

Information management covers all areas of internal and external automation and communication. Examples are (Waes, 1991): traditional business data processing and information systems, office automation and end-user computing, computer-aided business activities such as computer aided design and computer aided manufacturing, IT applications which add value to products and services and (tele)communications and networks. Services such as audio-visual media, and postal/courier services are not generally thought as falling under information management, even though they are clearly aimed at collecting and/or disseminating information which may be vital for the success of the organisation, although the service may be quite highly computerised nowadays. However, the dividing lines depend very much on the organisation concerned, and may not always be clearly defined. For example, telex or fax may be combined with electronic mail, which will normally come under the responsibility of the information management function.

Not only computers but also other new inventions have drastically influenced information delivery in organisations. These inventions vary in physical shape, in usability and in a technical sense. Examples are: new computer languages, computer networks (local and wider), more advanced printers and other peripherals, new (tele)communication-technologies and innovative software packages. All these technologies which are used for information delivery in organisations are called *information technology*. Management-issues around this technology will also be called *information management*. According to this description, information management includes the management of (new) information technology. Some authors use terms such as *IT-management* (Boynton and Zmud, 1987), *information resource management*

(Lytle, 1986) or *information systems management'* (Lederer and Sethi, 1988) in this context.

Abbreviations which will be used throughout this study and their meanings are:

IS: Information System(s)

IT: Information Technology

HIS: Hospital Information System

LIS: Local Information System(s)

MIS: Management Information System

IM: Information Management

Section 1.5 concentrates on the historical development of managerial thinking in the field of information management.

1.5   HISTORICAL DEVELOPMENT OF MANAGERIAL THINKING IN THIS FIELD

Over the past few decades, information management has become an issue of major importance for many organisations. Reasons for planning and managing the future development of information (systems) may include the need to integrate previously isolated information systems, the wish to align information systems with organisational goals and structures, and the ambition of management to come to grips with expenditure on IT and to acquire means of controlling the development process. In order to achieve these objectives, both researchers and practitioners started to think about something like information management in the seventies (although they did not call it by that name at that time). Since then there has been a rapid development of information management concepts, partly based on practical projects and experiments. A firm step has been made by the emergence of methodologies to support information planning. Some of these methodologies will be discussed in chapter 2. In this section, the development in thinking with respect to information management will

be described in different stages (Jonscher, 1994).

A fairly stable approach to information management developed between 1965 and 1975. During this era the information (technology) environment in most medium and large organisations was characterised by efforts to integrate their core business functions or functions where important efficiency advantages might be gained with information technology (Boynton and Zmud, 1987). As a consequence, an influential IS-function began to emerge in these organisations.

STAGE	STAGE 1	STAGE 2	STAGE 3
Characteri-sation	Initiation	Diffusion	Consolidation integration new opportunities
Period	1965 - 1975	1975 - 1985	1985 - date
Kind of applications	Functional cost reduction applications	Proliferation of cost reduction applications	Integration of old applications; development of new opportunities
IS organisation	Isolated, specialized, technological focus	More user oriented and service oriented reactive	Sometimes decentralised demand for business orientation
User awareness	Hands off	Enthusiastic/involved/ diversed/uninterested	Use, accountable, committed, knowledge
Management	Awareness, lax planning and control	Involved, but still delegating	Responsible, relation with business needs and organisational change
Managerial choice	One technological alternative	Some organisational and technological alternatives	Many organisational and technological alternatives
Decision dimensions	Technology	Technology, efficiency	Technology, efficiency, effectiveness, strategy people, structure, redesigning business processes
Technology	Large efficiency improving mainframes	Mini-computers telecommunication	PC's, networks, improved software, computerized communication facilities

Figure 1.2   Historical development and evolution of the thinking with respect to information management

Most information management responsibilities were delegated by the general management to this IS-function, which tended to operate as an information product/service manufacturing facility comprised of a development activity, an operations facility, a technical support services activity and an administration activity. This period was characterised by little general management involvement. Many smaller organisations and organisations with a minor information intensity (in the value chain or in the product, (Porter and Millar, 1985), described in subsection 3.2.5) were not yet automated. Most applications were directed towards gaining efficiency advantages. Information planning largely consisted of a rather straightforward transformation of an organisation's expected growth in business activities into transaction volumes, which in turn were converted into information processing workload levels. Strategies were then developed for supplying sufficient centralised computer resources to meet these workload levels (Waes, 1991; Pruijm, 1990; Boynton and Zmud, 1987).

From 1975 - 1985, automated information systems appeared in more organisations because this new technology became attainable for smaller organisations. In larger organisations, other departments than only the large transaction processing departments discovered possibilities for using information technology in order to improve their efficiency. The general management became more involved; they had to decide about budgets, control, planning and prioritisation. Formal information planning methodologies (such as BSP, see subsection 3.2.1) appeared; these methods helped the management and the IS-staff to get an overview and to align the IT-applications with the business.

From 1985 until now the information(technology) environment in many organisations has changed drastically. Different tendencies make it more difficult to characterise the direction of using information technology in organisations. Information technology was increasingly applied to support managers and professional staff, as well as to extend core applications beyond the current ones. Organisations which did not yet make use of

computerisation, because of their small size, their lack of knowledge of information technology or their unsuitability for computerisation became aware of the potential of information systems.

Different possibilities and opportunities (and to some extent paradoxical trends) appeared. Examples of such new developments are:
- the emergence of powerful and relatively cheap and small computers;
- the possibility of linking these computers into networks (local and in a wider environment);
- the possibility of linking computer-systems with other organisations in the same product chain in order to create interorganisational networks (also called Electronic Data Interchange, EDI);
- improved communication facilities by information technology;
- creation and implementation of new information systems by line and staff personnel independent of the IS-function; increasing knowledge with respect to using computers of non-specialists and more user-friendliness of computer-technology (improved software, improved hardware, improved accessibility);
- attainability of organisation-wide integrated databases which can be used in different applications on multiple levels throughout the organisation;
- increasing possibilities in process-supporting technologies with knowledge-based systems, process-automation systems, computer aided opportunities etc. which may lead to a fundamental reconsideration of work processes (Davenport, 1993; Earl, 1994; Hammer, 1990; Teng et al., 1994).

1.6   NECESSITY OF INFORMATION MANAGEMENT

All these trends and -in some cases- opportunities do not prove a certain general best direction. The trends are paradoxical and explain the reason for studying them. This technology provides many rather than few alternatives for patterning work and

organisation (Kraemer et al., 1989; Loveridge et al., 1985). Fitter (1987) argued: 'technology does not determine the way that work will change' (p. 106). This implies that there is a real (managerial) choice over how, which and when information technology can be applied in organisations. This explains the demand for clear and conscious information management. As Darnton and Giacoletto (1989) put it,

> 'Information technology has the potential either to lock an enterprise into a fixed organisational structure and way of doing business, or to unlock a whole range of possibilities through very flexible and adaptive processes to support different ways of meeting enterprise objectives' (p. 48).

Some consequences of using (or not using) information technology in organisations are:

- that it can give competitive advantage (McFarlan, 1984; Porter, 1985; Pruijm, 1990) and may enable a more effective design of business processes (Hammer, 1990; Earl, 1994; Teng et al., 1994);

- that use can be a critical success factor (organisations may become dependent on information technology (e.g. Earl, 1989, ;

- that it involves many stakeholders and can result in considerable organisational change (Keen, 1981; Markus, 1983; Boddy and Buchanan, 1986; Earl, 1989; Boonstra, 1991a, 1991b). This implies the possibility of considerable power struggles around the implementation of IT-applications in organisations;

- that the use of information technology is in many cases a high expenditure activity (Earl, 1989).

These consequences illustrate the impact on the organisation of the use of information systems and the need for a managerial approach, rather than a technical one. Reports about failure of automation-projects (Lucas, 1975; Riesewijk and Warmerdam, 1988) strengthen this argument. Some reasons for disappointment keep recurring and call for managerial support, involvement and commitment. Firstly, computers are often used to tackle the wrong problem; ineffectiveness becomes automated. Secondly, many researchers observe a lack of top management support and involvement. Thirdly, many prospective users are often passive and half hearted during planning and development stages. Finally can be mentioned that the project management shows often an

inadequate attention to human factors and to the political dimension of projects. Technical aspects of system development projects get disproportionately much attention in relation to organisational aspects.

Markus (1983a) distinguished three general reasons for resistance and failure of new information systems. Firstly the system itself (its technical performance or its poor information-providing capabilities), secondly the people who use the system (they do not like to work with information systems, they were not involved etc.) and thirdly the interaction, that is the political dimension of the information system. A new information system redistributes data and by this redistribution, the amount power of (groups of) people in organisations changes too (this notion of Markus will be discussed further in subsection 3.4.2). These possible changes may cause resistance (Markus, 1983a; Keen, 1981; Boonstra, 1991a, 1991b). Because of the wide dispersion of power in many professional organisations, it may be expected that this political dimension of information systems will be an important point of attention for the information management in professional organisations.

All these technological developments, consequences for the organisational strengths and reasons for disappointment and resistance which are mentioned above explain the demand for information management in organisations in general, but certainly in professional organisations. In chapter 3, some approaches to information management will be explained and discussed.

1.7   SCHEME OF THE ISSUES INVOLVED

Figure 1.3 schematises the various chapters in of this report in their mutual relation.

CHAPTER 1

Introduction
Central question etc.

CHAPTER 2

Relevant organisational issues:
-professionals
-professional organisations
-professional organisations and
 information (systems and policy)
-other kinds of organisations

CHAPTER 3

Current approaches to
information management
BSP, CSF, Nolan alter-
native approaches and
discussion

CHAPTER 4

Methodological
aspects and
considerations in
relation to the
case studies

CHAPTER 5,6,7

Introduction in case-
studies and description
of case studies according
the chapter 2,3 starting
points

CHAPTER 8,9

Discussion about:
-professional organisations
-managerial issues in professional
 organisations
-information management issues
-current approaches of IM and their
 relevance for professional organisa-
 tions
-implications for management
-implications for research

Figure 1.3   Scheme of the various chapters and the relation among these chapters

CHAPTER 2

PROFESSIONALS AND PROFESSIONAL ORGANSATIONS

2.1   INTRODUCTION

This chapter will examine current thinking with respect to professionals and professional organisations. Various approaches in the literature will be discussed and definitions will be presented as well as the selection of the professional organisations. Assumptions as found in literature with respect to professional organisations and information management will be discussed and formulated as assumptions which may be accepted, rejected or adapted through the research.

2.2   WHAT IS A PROFESSIONAL?

The term 'professional' has a great variety of meanings, and it is operationalised in various ways. Some of these ways of defining professionals will be discussed in this section, especially the attributes approach, the power approach and the Professional - Management conflict approach. A definition of a professional, which is based on the discussion, will be constructed. Finally, the selection of professionals and professional organisations in the case-studies will be explained.

2.2.1   The Attributes approach

One approach (Kerr et al., 1977) is called the *attributes approach* and attempts to distinguish the professions from non-professional occupations by citing a set of attributes which should point out the distinctiveness of professional groups (Raelin, 1992; Reed, 1985). Kerr et al. (1977) mentioned the following six attributes.

1 Expertise
This will normally stem from a prolonged specialised training in a body of abstract

knowledge which is often not easily available to lay public. Haug stated about this:

> 'The trained professional is a specialized expert qualified to deal with problems in a strictly limited area' (Haug, 1977, p. 216).

Bucher and Stelling (1969) emphasise that the professional claims that he or she possesses the knowledge and skills to define problems, to set the means for solving them, and to judge the success of particular courses of action within this area of competence (ibid, p. 4).

2   *Autonomy*

This involves the feeling that the practitioner ought to be able to make his or her own decisions without external pressures from clients, those who are not members of the profession, or from his or her employing organisation (Hall, 1968). It is the perceived right to make choices which concern both means and ends.

Etzioni (1964) stated about this:

> 'only if immune from ordinary social pressures and free to innovate, to experiment, to take risks without the usual social repercussions of failure, can a professional carry out his work effectively. It is this highly individualized principle which is diametrically opposed to the very essence of the organizational principle of control and coordination by superiors-i.e., the principle of administrative authority' (p. 76).

Freidson (1970) characterised this as *'officially created organised autonomy'*. This autonomy is not only defined in the direction of organisational autonomy which means that the professional has a high level of self control, but also an autonomy towards customers. Haug (1977) states in this context:

> 'it is the knowledge monopoly, accompanied by varying claims to an altruistic orientation, which legitimates professional autonomy in task performance and institutionalizes client obligations to trust the professional and comply with his prescriptions. The inequality, the power imbalance between practitioner and client is a product of the 'competence gap' between the two parties to the interaction. Ideally, professionals have the right to define the client's problem, outline the necessary course of action to deal with the problem, and manage or supervise compliance with the action plan, because they and only they in their occupational roles know what is in that client's best interest' (p. 217).

3   *Commitment and identification*

Commitment is primarily directed toward *the work, the clients and the profession* much more than to the organisation in which the professional is employed. The identification with other professionals is often higher than the identification with the (professional) organisation in which they do their professional work (Raelin, 1992; Reed, 1985).

4   *Ethics*

This is a perceived obligation to render service without concern for self-interest and without becoming emotionally involved with the client. Blau and Scott (1962, p. 61) call this *affective neutrality*, which should protect the client from being emotionally exploited and the practitioner from being emotionally torn apart by sympathy.

5   *Maintenance of standards among colleagues*

Professional decisions are governed by universal standards and are based on certain objective criteria which are independent of the particular case and independent of the specific organisations in which the professionals work (ibid.). Professionals will have a perceived commitment to help police the conduct of fellow professionals. It also includes a belief in self-regulation - this involves the belief that the person best qualified to judge the work of a professional is a fellow professional, and the view that such a practice is desirable and practical. It is a belief in colleague control (Hall, 1968).

These attributes were selected by Kerr et al. (1977, p. 332) from many sources; each attribute is mentioned by a number of authors in a relatively consistent way, but not all the authors accept each attribute as being of equal importance. The list represents ideal professional characteristics. Not every professional will have all these characteristics but he or she will at least feel that some of the attributes refer to one's own situation. It is important to emphasise that it is not possible to distinguish professionals from non-professionals in an absolute sense. Some people can be more 'professional' than others. There is a continuum between the ideal professional, who

should have all the attributes and the non-professional, who will be characterised by the opposite of the attributes mentioned (ibid., p. 341).

Many people also mention other characteristics as already mentioned in the attributes above. A distinguishing mark which is often mentioned is that professionals offer *applied knowledge*, e.g. a judgement, information or expertise as a personal service to their clients and customers. A minority of the professionals produce physical things, e.g. doctors, to some extent, and craftsmen. Many professionals seek autonomy, challenge, variety and meaningful work in their working life, rather than a career in an organisation.

Hall (1968) added two dimensions to the professional attributes. He stated that some characteristics are part of the *structure* of the occupation, including aspects such as formal education, professional associations and entrance requirements and that other characteristics are more *attitudinal*. The attitudinal attributes of professionalism reflect the way in which the practitioners view their work. Attributes such as commitment and identification are rather personal and attitudinal and will differ more among individuals. Figure 2.1 illustrates these continua in which individuals and occupations can be more or less professional according to the attributes approach. Blau and Scott (1962) published interesting data with respect to different attitudes among practitioners with professional orientations and practitioners with a more organisation directed orientation, they called it a bureaucratic orientation.

```
non-professional attitude   ◄─────► professional attitude


non-professional occupation ◄─────► professional occupation
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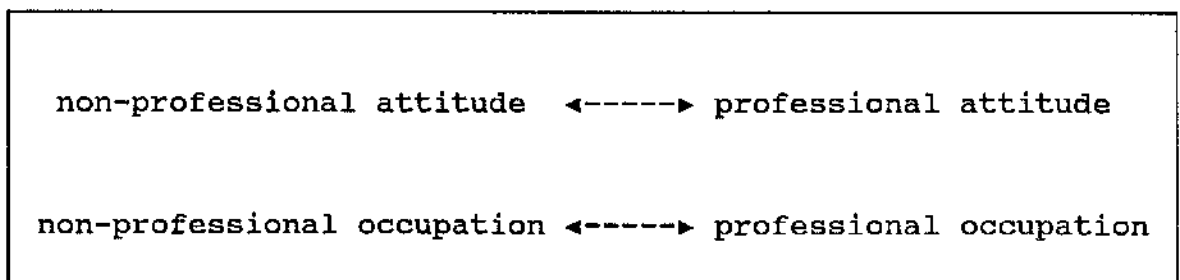
Figure 2.1   Attitudinal and structural attributes of professionalisation (based on Hall, 1968)

It is easy to criticise the attributes approach. The list will never be complete, will be sometimes too long, is hard to operationalise, represents ideal characteristics which will not really exist in that way, is static, ignores the power-dimension of professionalisation and is partially an acceptance of the professionals' own definitions of themselves (Johnson, 1972; Raelin, 1991, 1992). This important criticism does not diminish the usefulness of defining characteristics of professionals, but explains the demand for additions and other approaches, in order to refine the definition.

2.2.2   The Power approach

Certain sociologists define professionals in an alternative way which adds another perspective to the attributes definition. This alternative definition emphasises the dynamic or process dimension of the work of professionals and will be called the power approach here. Johnson (1972) suggests that professionals

> 'purposely differentiate themselves from other occupations by using political and social influence to advance the status of their occupation. The net effect of this power process would be that the professional group in question would be able to exercise a monopoly of its expert services while enjoying relative freedom from external intervention' (p. 35).

Boreham (1983) considers professionalisation as:

> 'a process wherein an organised occupation negotiates the right to perform certain types of work and to have a controlling influence in training for and, hence, entry into the occupation and in determining the way in which work is performed' (p. 694).

The argument is that professionals define services, which they think only they can perform properly, in order to maintain autonomy and influence and to raise their status and their income. They try to regulate entry to that profession, they control the requirements, they define levels of competence and they protect their specific occupational knowledge by mystification. Haug (1977) perceives the monopolisation of areas of knowledge as the basis of professional power and the core of the concept of profession. Monopolisation is in essence a power process. She states:

> 'The difference between them and other workers, whether white-collar or blue-

collar, is that heretofore they have largely achieved this power, and been able to persuade the community to legitimate it, and even legalize it through licensure' (p. 217).

Professionalisation is defined as a political process in which knowledge and skill are claimed by a group to advance its political, economic and legal interests (Scott, 1982; Freidson, 1983). An occupation can have a go at professionalisation, but such an attempt will not necessarily succeed in all cases. A clear strategy, a solid professional association, a well-chosen moment and relationships with powerful people are often needed to move occupations socially upwards (Klegon, 1978).

Wilensky (1964) outlined a clear sequence illustrating the history of the professionalisation of certain occupations in the United States. This sequence consists of five different stages. These stages are: 1) the emergence of a full time occupation, 2) the establishment of a training school, 3) the founding of a professional association, 4) political agitation directed towards the protection of the association by law and 5) the adoption of a formal code. This sequence is -of course- historically specific and culture-bound. There is no reason to suppose that there is one uniform and unilineal process of professionalisation which can be applied universally. Nevertheless, the value of this sequential model is that it shows that professionalisation does not only depend on the attributes of a certain occupational group -as the attributes approach suggests- but that it also depends on the social and political skills of the professionals to organise themselves and to use their power in order to gain recognition as professionals.

This suggests that professionalisation demands certain social conditions under which such a process can take place. The power approach does not attempt to answer the question *'Is this occupation a profession?'* but the more fundamental one: *'What are the circumstances under which people in an occupation attempt to turn it into a profession, and themselves into professional people?'* (Johnson, 1972, p. 31). Bucher and Stelling (1969) observed in many organisations

'the struggle of different groups for varying levels of professional recognition,

with differential success in different locales.' They state: 'The reward for success is autonomy and influence' (p. 4).

The power approach emphasises that professionalisation is a dynamic process aiming at becoming *and* remaining a 'professional' occupation. Bucher and Stelling (1969) state:

> 'Having one's claims accepted is not a one-shot affair. The professional does not earn his status once and for all. Rather, it is a continuous process in which his claims to competence are being tested every day in interaction with others and he can lose the respect of others' (p. 4).

The power approach and the attributes approach are not necessarily contradictory but emphasise different aspects of professionals. The professional will use certain attributes as a means of power (such as expertise, standards and identification) to enjoy and achieve other attributes such as autonomy. This power approach with regard to the distinction between professions and non-professional occupations is developed by authors who felt dissatisfaction with just constructing lists to differentiate professions from non-professions. Their main criticism was that it is impossible to apply the lists of criteria to concrete situations. Klegon (1978) and Johnson (1972) discuss this definitions and approach question extensively.

2.2.3 The Professional - Management conflict approach

A third approach which characterises the professional in an organisation is to contrast him or her with the managers of that organisation. This is called the *Professional - Management conflict* (Raelin, 1991, 1992; Gouldner, 1957 and Blau and Scott, 1962). This approach considers the distinctiveness of the organisational roles of managers and professionals whereby the professional is viewed as *the cosmopolitan* and the manager, as the personification of the organisation, as *the local*.

Cosmopolitans are defined by Blau and Scott (1962) and Gouldner (1957) as

> 'maintaining relatively little integration in either the formal or informal structure of the organisation, and not having much loyalty to the organisation as a result

of their responsibilities toward outside professional reference groups'.

Raelin (1991) offers a cosmopolitan checklist which he developed on the basis of his research and which helped him to determine whether someone has a cosmopolitan orientation. 'Yes' answers indicate cosmopolitan predispositions:

> '-The person believes s/he should be able to make his/her own decisions about what is to be done on the job.
> -The person would probably stay in the profession even if his/her income were reduced.
> -The person's best friends tend to be members of his/her profession.
> -The person has little interest in moving up to a predominantly administrative position in the company.
> -The person believes his/her professional colleagues or professional association are better equipped to evaluate his/her performance than management.
> -The person is primarily interested in advancing his/her professional reputation rather than a corporate reputation' (p. 16).

Locals are the reverse of the cosmopolitans. They are loyal, promote organisational integration, and feel a strong responsibility towards their own organisation. Individual professionals can -of course- be strong in both orientations and managers with a professional background can have cosmopolitan characteristics, but many people observe the distinction between both orientations in real life, and they are aware of the potential conflict which may arise as a consequence of the discrepancy between the conceptions among managers and professionals of the organisation. Many professionals perceive the higher levels in the organisation as bureaucrats, 'datacrats', people who disturb the autonomous work processes of professionals through endless streams of paperwork, procedures, prescriptions, regulations and schedules. Weggeman (1992) quoted Badaway:

> 'The scientist/engineer sees the manager as a bureaucrat, paper shuffler and parasite, an uncreative and unoriginal hack who serves as an obstacle in the way of creative people trying to do a good job, and a person more interested in dollars and power than knowledge and innovation' (p. 43).

The tension in professional organisations between professionals and managers tends to result in two general directions, the *managerial direction* where the professionals are clearly subordinate to the management and the *professional direction*, where the

professionals are in power and administrators are primarily facilitative. McKinlay and Arches (1984, p. 181) call this distinction the Weberian *Professional Bureaucracy* dominated by administrators, versus the *Professional Organisation* dominated by professionals. This explanation of these two terms is not generally accepted.

The attributes approach, the power-definition and the Professional - Management conflict approach can help to explain the basis for the potential conflicts and contradictory interests between managers and professionals. E.g. professionals can try to use their expertise as a means of expert power to use the managers for their own purposes and move them to the periphery of the organisation. But managers can often use their legitimate (often hierarchical) power, their personal power and their power to allocate budgets to promote efficiency and they will often have little patience with elegant but inefficient professional procedures. Professionals want to have *autonomy* with respect to the conditions, pace and content of their work, while managers will try to *control and coordinate* that work in order to reach overall organisational objectives.

To what degree such a Professional - Management conflict will surface in a real situation depends on many conditions of organisational life. Personal characteristics of specific managers and professionals, the political power of both professionals and managers, the organisational and regional culture, the competition and the strength of the professional associations may provide some explanation regarding this question. In practice, this dimension may be hidden or open, constant or variable in intensity and fierce or quiet and rational (Dawson, 1994, p. 5). But it is important to emphasise the fact that this is an inherent characteristic of the phenomenon of the professional organisation.

2.2.4 Professional associations

Besides seeking autonomy in their work, professionals tend to become committed to their profession. Professional occupations are often organised in strong associations, which help the professionals to maintain their skills and to meet fellow-professionals from other organisations. These professional associations often have articulated codes of professional standards and ethics which are not necessarily compatible with organisational rules and procedures. The result of these strong associations -and their relations-network- is that many professionals feel more commitment and loyalty to these organisations and their professional-colleagues than to their own organisation. These associations will often strengthen the power position of the professionals (section 2.2.2) through obtaining a legal status which gives them a monopoly over a body of knowledge which makes it relatively inaccessible to lay people (Freidson, 1984).

2.2.5 Discussion and examples

In the sections 2.2.1, 2.2.2 and 2.2.3, three different approaches are discussed, which deal with professionals, professionalism and professionalisation. Each approach emphasises different aspects. The attributes approach attempts to answer the question *'what is a professional?'*, and *'how can such a person be characterised?'*. This is probably the first question which will be raised when a study deals with questions with respect to professionals, professionalism and professionalisation. The question is hard to answer because some occupations may have some professional characteristics according to the attributes-list, but their practitioners are not so much perceived as professionals as practitioners of other occupations.

These differences can often be explained by the power approach. This approach attempts to answer the question of how occupations can become professions and which circumstances and conditions are needed to move occupations socially upwards in the

professional direction. This approach also explains why some occupations are perceived as more professional than others while their attributes look slightly the same.

The Professional - Management conflict approach discusses the organisational consequences of professionalisation and the emergence of professionals in organisations. This approach is helpful to understand why professionalisation of occupations has considerable consequences for the management in such organisations, and it is also a good basis to continue research in the direction of the (information) management of professional organisations. A critical question in this context is whether a certain information system will promote or undermine the professionality of a certain occupation.

In this section, a short description of professionals will be formulated, which is based on a literature study. An attempt is made to apply the attributes-approach as well as the power-approach and the Professional - Management conflict approach in this short description. It does not draw sharp lines between professionals and non-professionals: this is not possible. The extent to which a person is a professional or an occupation is a professional occupation has to be seen as a continuum rather than that a clear answer, either 'yes' or 'no', can be given to this question. Figure 2.2 illustrates this continuum.

```
High expertise             ← →              Low expertise
High autonomy              ← →               Low autonomy
Self control               ← →        Control by management
Task not easy to struc-    ← →        Task easy to structure
ture or to formalise                      or to formalise
Use of expert power        ← →      Non use of expert power
Profession orientation     ← →      Organisation orientation
Organised in a profes-     ← →   Unionised or not organised
sional association

PROFESSIONAL                                NON-PROFESSIONAL
```

Figure 2.2   The professional - non-professional continuum

The word 'often' could be placed before every statement in this description:

'Professionals offer their applied knowledge services in a personal and autonomous way to their customers. Becoming a professional demands a long formal study. Professionals are organised in professional associations and feel a stronger commitment to their profession and to fellow-professionals than to the organisation in which they eventually work'. Raelin (1991, p. 8-9) offers an arbitrary list of some occupations which are commonly perceived as professions. These are: accountants, airline pilots and controllers, architects, artists and writers, clergy, doctors, engineers, computer scientists, foresters, lawyers, nurses, pharmacists, psychologists, counsellors, social workers, scientists, teachers, professors and urban planners.

2.3   PROFESSIONAL ORGANISATIONS

In this section, the professional organisation as a distinctive type will be described in section 2.3.1. Section 2.3.2 categorises various kinds of professional organisations in order to clarify that a professional organisation is not a homogeneous static entity but that it is constantly changing, partially on the heteronomy - autonomy continuum. This categorisation will later be used to indicate in which directions such organisations may change, partially through information systems.

2.3.1   What is a professional organisation?

An organisation with (some) professionals as employees is not necessarily a professional organisation. Mintzberg (1983) defines a professional bureaucracy as follows:

> 'the professional bureaucracy relies for coordination on the standardization of skills and its associated design parameter, training and indoctrination' (p. 190).

Scott (1982) defines a professional organisation simply as

> 'an organisation in which the primary or core tasks are performed by

professional participants' (p. 213).

A professional organisation relies on professionals, because they perform the basic work of the organisation, they produce the products and render the services of the organisation. They are the operating core of the organisation. The operating core is -in Mintzberg's terms- the key part of the organisation, where the primary process is carried out.

Mintzberg also distinguishes the *strategic apex* (the top of the organisation), a *middle line* (as a coordination chain between strategic apex and operating core), the *technostructure* (for organising and controlling the standardisation of work processes) and the *support staff* (to support the operating core with various services). These parts can be represented in a diagram as shown in figure 2.3
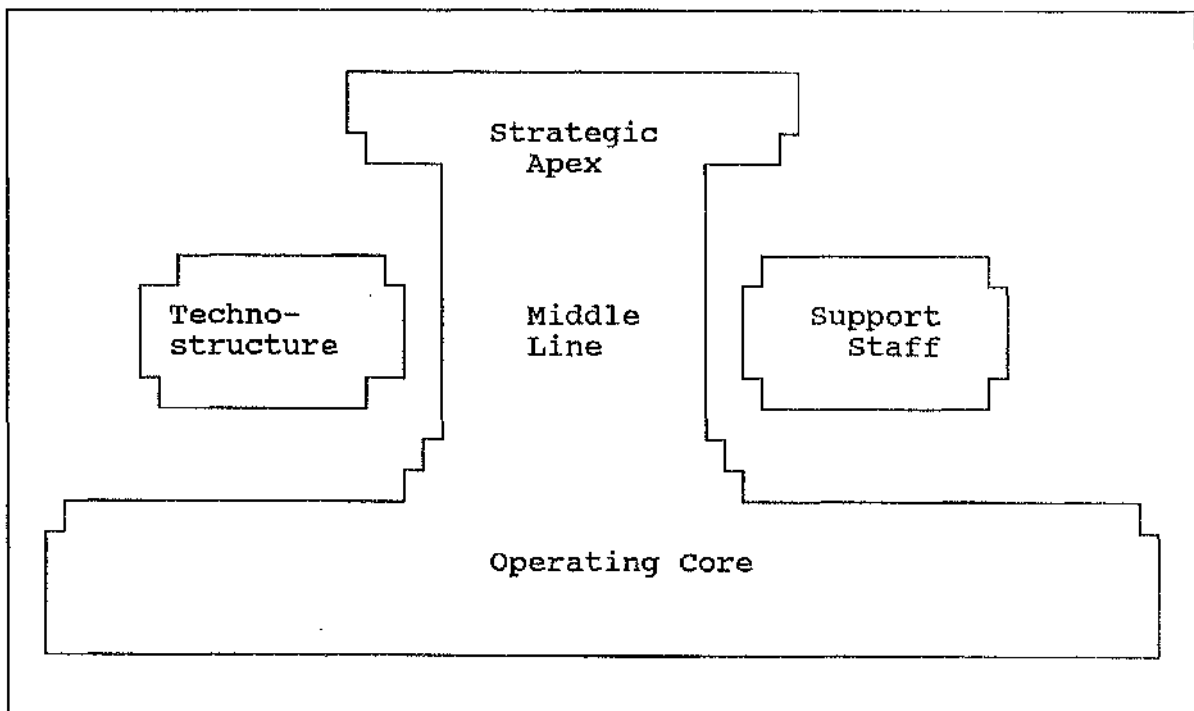
Figure 2.3   The five basic parts of organisations (Minztberg, 1979, p. 20)

Mintzberg suggests that the technostructure and the middle line of management in

professional organisations are not expected to be highly elaborated because there is little to coordinate. Professionals should reject a lot of planning and formalisation. The support staff is often well developed in order to support and assist the professionals. Services such as secretarial work, libraries, cafeteria, laboratories, computer services and editors are needed so that the (often expensive) professionals are able to focus their attention as much as possible on their specialist work. Professional organisations should be decentralised, because the work is too complex to be supervised and planned and because professionals do not allow other people to control them to a great extent. The extent to which this is the case will depend on a number of factors because the power of professionals in professional organisations will not always be the same.

Mintzberg (1979a, 1983a) observed in many professional organisations parallel administrative hierarchies, one democratic and bottom-up for the professionals, and a second machine bureaucratic and top-down for the support staff. In the professional hierarchy, power resides in expertise, knowledge and skills. A lot of power remains at the bottom of the hierarchy, with the professionals themselves. In the non-professional hierarchy, in contrast, power and status reside in administrative office. Figure 2.4 illustrates this concept of two parallel hierarchies which are kept quite independent of each other.

Professional organisations should appear more in relatively stable environments than in fast changing environments. The environments of professional organisations have to be stable enough to define the skills which are needed and to train people extensively to carry out this basic work. The knowledge bases which professional organisations need are sophisticated.
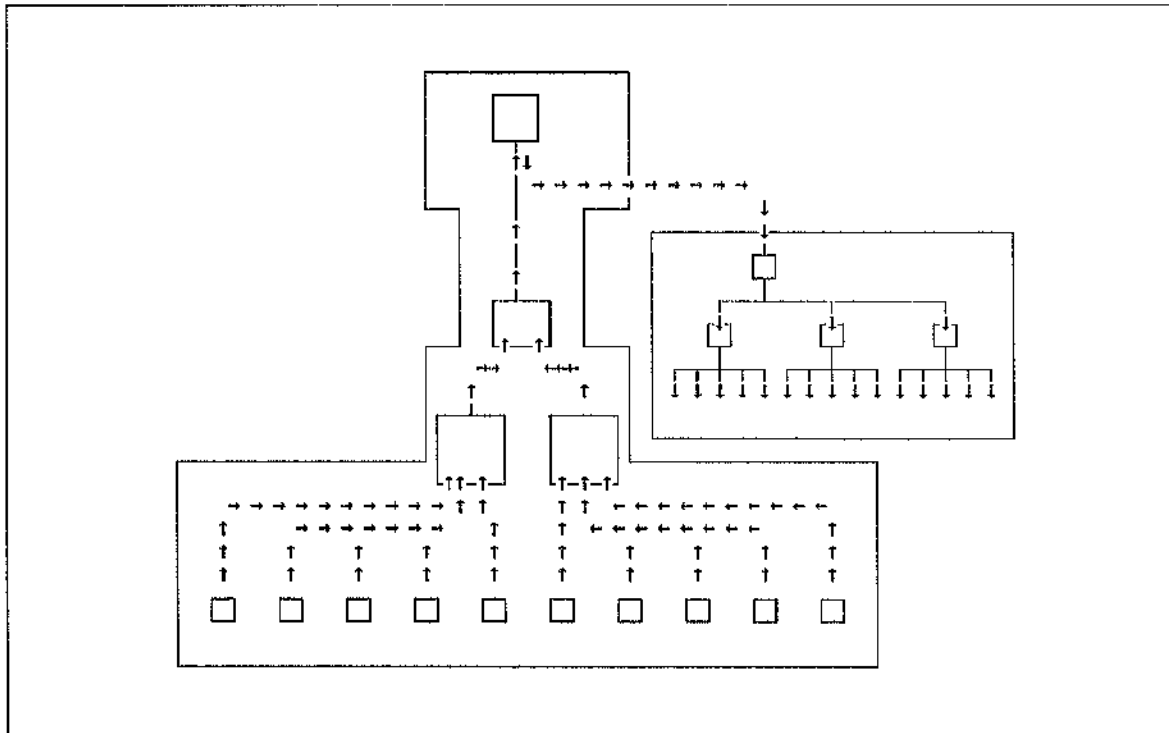
Figure 2.4 Parallel hierarchies in professional organisations (Mintzberg, 1979, p. 361)

2.3.2 Kinds of professional organisations

Mintzberg defines the professional organisation as an extreme type, in order to distinguish it from other types in his organisational typology (Mintzberg, 1979a, 1983a). People who study this kind of organisation more extensively discover a varying managerial influence and a varying dependence of professionals on the organisation. This aspect will be elaborated in this section.

Scott (1982) identified three primary arrangements for structuring the work of professionals in professional organisations. He identified these arrangements in

American hospitals; in this study, this approach is generalised to professional organisations in general. These three models are the autonomous, the heteronomous and the conjoint professional organisation.

2.3.2.1   *Autonomous professional organisations*

The autonomous professional organisation exists to the extent that the administrators delegate the responsibility to define and implement the goals, the performance standards and the control procedures to the group of professionals. In organisations of this type, control over the nature and quality of professional practice is vested in the professional staff, not in the administration. Lay control over professional discretion - whether client or administrative- is viewed as inappropriate. This autonomous model is the closest to Mintzberg's description, which is elaborated in section 2.3.1; this is the pure professional organisation. An important means of control in this professional staff system is peer group control. This is based on the expectation that professionals observe, correct, and, if necessary, sanction each other. These processes should be more likely to operate in collective settings (such as hospitals), where practitioners often work closely together than in independent, decentralised practices. There are several ways of peer group control. Four ways of peer group control are described below.

Differential peer group control. In many professional organisations, the seniority principle operates as an important basis of control. Professionals in training work under the direct supervision of other professionals and are explicitly evaluated for the quality of services they deliver. The degree of differentiation can be formalised in official ranks or can be informal. The differential peer group control will probably be more effective in professions where this differentiation is more formalised.

Formalised peer group control. If groups of professionals become departmentalised, a

certain degree of control becomes institutionalised. Departments of professionals arise, headed by e.g. spokespersons, chairmen, chiefs of staff or directors. Such a formalisation can be the start of a move from a collegial structure toward that of a bureaucratic hierarchy and to the heteronomous structures as explained later in this section. Various factors affect the extent to which these institutionalisations tend towards bureaucratic hierarchy such as:

- the temporariness of certain appointments, if an appointment is temporary the effect is less than that for an appointment for an indefinite period;

- collegial elections of spokespersons versus administrative appointments; elected and temporarily chosen spokespersons have less power to control than appointed chiefs for an indefinite period;

- the degree and the types of control; only control over selection of professionals or also performance controls. Performance controls can occur before, during and after the activity. Controls during the professional activity are more far-reaching than controls before or after the activity.

Externally authorised formalised peer group controls. Certain institutions outside the professional organisation itself can perform controls. The professional associations or governmental organisations can appoint auditors who judge, assess, review or evaluate the work of a certain professional or a group of professionals.

2.3.2.2   *Heteronomous professional organisations*

Professionals in these organisations are more constrained by administrative controls than their counterparts in autonomous structures: they are subject to routine supervision (Scott, 1982, p. 223). Certain changes can be mentioned which explain the manifestation of these kinds of organisations. Examples of such changes are described below.

1   Increasing interdependence between different professionals, between different professional departments, and between professionals and other organisational units. This argument is especially valid in organisations where different people and different departments add value to the product. This may be the case in hospitals.

2   Increasing costs and external pressures on the organisation for cost containment and improved efficiency. Efficiency and cost consciousness have to be implemented by the administrators, who are responsible for the total costs and who control the costs of the professional work. This cost-pressure can be initiated by governmental action or by increasing competition among professional organisations.

3   Demands from customers and clients who expect more integrated services from the organisation as a whole instead of a personal service from one specific professional. Patients expect total care from hospitals and large customers of consultancy firms ask for reliable services and uniform quality standards for a fixed price.

These developments have often led to the growth of power of administrators and managers. They are increasingly expected to plan, coordinate and control the professional work. In heteronomous professional organisations,

> 'the emphasis shifts from a reliance on professional autonomy and individual discretion to organizational arrangements supporting a well-defined division of labor together with structural devices to ensure coordination and control of the individual contributions. Greater efforts are expended to codify, standardize and quantify procedures to ensure improvements in the modal level of practice and greater consistency among practitioners' (Scott, 1982, p. 225).

Heteronomous professional organisations tend to become conventional bureaucracies with a horizontal division of labour (often along functional lines) and vertical hierarchies to direct and coordinate the work flow. Although, as an important difference, mention can be made of the fact that the individual professionals still have considerable discretion over means, methods and techniques within the general constitutional framework of objectives and rules. The professionals are viewed as providers of a subset of required tasks which contribute to the problem of coordination. The administrators, managers, directors and clerks are expected to

orchestrate and integrate these contributions in order to produce the required service.

2.3.2.3   *Conjoint professional organisations*

Conjoint professional organisations try to find a balance between the autonomous and the heteronomous control models. Professionals and administrators are roughly equal in the power that they command in these organisations; they coexist in a state of interdependence (Scott, 1982). Autonomous professional organisations give priority to micro concerns in the relationship between professionals and clients while heteronomous professional organisations reverse this and favour macro concerns of efficiency, control and costs. Conjoint organisations try to balance this because they recognise that both approaches are legitimate but one-sided. This results in an organisation with a pluralist character, where both approaches compete in a dynamic balance between micro and macro considerations. Neither autonomy nor control are the final solutions.

The considerations preferred will depend on the problem being solved. The different models are summarised in figure 2.5. This approach of Scott has to be seen as a continuum model, with two extreme types on both sides and a middle of the road approach between these two.

AUTONOMOUS PROFESSIONAL ORGANISATIONS	CONJOINT PROFESSIONAL ORGANISATIONS	HETERONOMOUS PROFESSIONAL ORGANISATIONS
Professionals are dominant	Roughly equal power division	Administrators are dominant
Micro focus, client oriented	Micro/macro balance client/product balance	Macro focus product oriented
Administrators support the professionals	Collaboration of professional and administrative factions	Administrators manage professionals
Self control and independence of the professional group	Loose control and mediate levels of interdependence	Tight managerial control and high levels of interdependence
Independent professional units	Matrix structures and projects; competing bases of authority	Hierarchic bureaucracy

Figure 2.5   *Comparison of different models of professional organisations (based on Scott, 1982)*

Two centres of power, the administrators versus the professionals are the core of the organisation and it depends on many factors which arrangement will occur. Important determining factors are: organisational power and politics, legal aspects, environmental aspects, social/economic level of administrators and professionals and the kind of product of the organisation and its need for coordination.

2.4   PROFESSIONAL ORGANISATIONS AND INFORMATION SYSTEMS

It is reasonable to suppose that the specific characteristics of professional organisations have an impact on the use of information systems in such organisations and on the practice of information management. This assumed impact will be elaborated in this section. These assumptions will be related to the information systems typology of Markus (1984) which will be explained in subsection 2.4.1 and to the various approaches of section 2.2. It will also be linked to the different kinds of professional organisations of subsection 2.3.2.

2.4.1   Assumptions with respect to kinds of information systems in professional organisations

Information systems serve different functions in organisations and can thus be classified by organisational impacts. Markus (1984) developed such a classification and identified five system types and system functions. This categorisation has been updated to some degree to make it more applicable in this context. The result of this is shown in figure 2.6.

Operational and registrative functions aim to rationalise and routinise work and to record operations. The goal of rationalisation is to reduce labour time and costs by making the work process more efficient and the goal of routinisation is to make the

process uniform so that outputs are consistent and predictable (ibid., p.15-16). Operations recording systems aim to improve the efficiency of the recording and the financial settlement of operations (ibid., p. 16). *Planning, monitoring and control functions* are intended to evaluate the performance of people and organisational units and to motivate people to improve their performance (ibid., p. 20-24).

SYSTEM FUNCTIONS	ORGANISATIONAL OBJECTIVE OF THAT FUNCTION
Operational and registrative functions	To rationalise and to routinise work, to record operations
Planning, monitoring and control functions	To evaluate performance and motivate people
Decision and knowledge functions	To support intellectual processes
Communication functions	To augment human communication
Interorganisational functions	To facilitate interorganisational transactions

Figure 2.6   System Functions and organisational objectives (based on Markus, 1984)

The performance in question may be that of an individual or that of a department, a division or a subsidiary. The purpose of monitoring may be to assist the planning process, to facilitate organisational learning with respect to variances or to motivate or press people to achieve better results. *Decision and knowledge functions* are designed to support processes and activities that are primarily intellectual, such as drawing conclusions from evidence, making predictions from past performance (ibid., p. 24-29), diagnosing clinical pictures and judgmental problems. Decision support systems, expert systems and knowledge based systems are examples of systems within this category. *Communication functions* are means of formal or informal and structured or

unstructured communication among people. Such functions in systems attempt to transcend distance and make the operations independent of the location of people and resources (ibid., p. 29-32). *Interorganisational functions* are intended to facilitate transactions involving more than one organisational entity (ibid., p. 32-34).

It is important to emphasise that one specific information system may have more than one of the above mentioned functions. Besides, systems are often linked so that monitoring and control systems may be based on operational systems and so may planning and decision systems be based on both of them. This section will examine the assumed impacts of these functions and systems in professional organisations, especially in relation to the attitude of the professionals towards these systems if they are affected by it.

2.4.1.1   *Operational systems*

Mintzberg (1983a, p. 203) suggests that the technical system of a professional organisation is 'neither highly regulating, sophisticated, nor automated'. His argument for this statement is that the professionals serve their clients directly and personally. Regulating and formalising technical systems are in contrast with this feature of a professional organisation. The professional should resist attempts to formalise, rationalise or routinise his/her work. Formalisation would destroy the autonomy which s/he seeks.

Boreham (1983) quotes Freidson, who suggests that professionals have institutionalised specialisation, which is a revival of pre-industrial modes of work as alternatives to administrative rationalisation. The suggestion is that formalisation and training are basically substitutes: high training and education results in low formalisation. Hall (1968) concludes that:

'As the level of professionalization of the employees increases, the level of

formalization decreases' 'The presence of professionals appears to cause a diminished need for formalized rules and procedures. Since professionals have internalized norms and standards, the imposition of organizational requirements is not only unnecessary; it is likely to lead to professional-organisational conflict' (p. 121).

Raelin (1992) expects that:

> 'professionals resist attempts of the management to formalize or to control their operations. Even in the face of technological change, such as computerization, which can accelerate the routinization of tasks hitherto considered the prerogative of trained professionals, professionals at the top of their respective hierarchies have insisted on the retention of certain exclusive, professional activities' (p. 174).

The goal of operational systems is to rationalise and/or to routinise. Rationalisation is directed towards values such as efficiency and cost consciousness, while professionals are more interested in proficiency and professionality. Professionals will probably allow rationalisations if their work will not be affected by it.

Routinisation is directed towards uniformity, consistency and reliability. The suggestion is that professionals have internalised professional standards which guarantee a certain level of consistency and uniformity. Professionals would probably accept or support systems which help them to maintain their standards loosely and flexible, but they will resist systems which force them to change or to adjust their professional standards or which control their professionality tightly. Fitter (1987) argues with respect to the medical profession about this point:

> 'Information technology may play a significant role in further rationalization and efficiency promotion strategies. However, the process of rationalization at the core of health care would not be straightforward, for the following reasons:
> - The medical profession still has a substantial role in health care planning and decision making. By and large it neither has much experience in management rationalization techniques, nor is it likely to show much enthusiasm for changes which could result in less autonomous working conditions.
> - Using information technology to rationalize the delivery of care may lead to specific reductions in the quality of the service provided to patients, and may lead to depersonalizing of health care. Such considerations are vital to personal service organizations, and are in

contrast with activities in manufacturing industry, where the output from a production process is an inanimate object. The tradition of the medical profession, which extends back to the Hippocratic oath, is to put first the interests of the individual patient. Thus considerations by which 'cost effectiveness' determined priorities for resource allocations have second place' (p. 107).

Various factors will influence the professionals' attitude towards operational systems. Two important factors are mentioned here. Firstly the degree to which their work will be affected by these systems. The more they will be affected, the more critical they will be. The professional will be specifically sensitive to the influence of operational systems on the level of autonomy. This should explain that professionals will be relatively indifferent if these systems are directed primarily towards the support staff. Secondly can be mentioned the flexibility of the operational system and the degree to which the system benefits the group of professionals and does improve the level of professionality (such as the level autonomy, self control and flexibility).

2.4.1.2   *Planning, monitoring and control systems*

The previous quotation of Raelin in section 2.4.1.1 refers to formalisation *and* control. Consequently, the same expectation of formalisation systems can be mentioned with respect to control systems. The professional organisation controls the choice of its workers, and delegates the methods of work and standards to the professionals themselves and their professional associations. But computers can be used *'to assess professional performance according to the authoritative standards stored within it'* (Freidson, 1984, p. 4). The suggestion is that professionals will resist monitoring and control systems, automated and non automated. Professionals will perceive monitoring and control systems as a reduction of their autonomy in favour of the monitoring units. They will argue that their activities need high levels of individual discretion which cannot be reduced to formal rules which can be rationalised and controlled (Boreham, 1983).

This should explain the small technostructure of professional organisations. The control analysts of the technostructure try to standardise the operating workflow according to certain procedures which they develop in order to control the work of the operating core and to improve the efficiency. The highly skilled professionals at the operating core of a professional organisation will perceive such activities as unacceptable to a certain extent.

The level of unacceptability will depend on various factors. Among these can be mentioned the question whether the control data are used by the professionals themselves for so called self-control purposes or that the control data are transmitted directly to the management or other people. In the second case, the level of resistance will obviously be higher. A second factor is the question whether the professionals perceive the control data as relevant or not. When they think the data are relevant, the resistance will be lower than if the professionals perceive the data involved as irrelevant to their work and only useful for administrators. Finally, it can be expected that the professionals will be indifferent if the control systems are directed to other people in their organisation, such as the support staff.

Reed (1985, p. 3280) perceives operational systems and monitoring and control systems in the context of hospitals ('protocol oriented medical automation') as a diminution of the autonomy of physicians, which relegates physicians to technicians who carry out the policies of their corporate and governmental bosses. McKinlay and Arches (1985) argue that information systems in hospitals will contribute to the demystification of knowledge and will ease the process of evaluating and controlling physicians in their work. Data on illness and average length of hospitalisation should already be used as a basis of reimbursement by insurance companies. These data should also be used to evaluate whether physicians are spending too much time with patients and/or using the most efficient technologies. They state (p. 179):

> 'Codification of medical knowledge and the ability of management to dictate how work should be broken down and performed so as to be most profitable

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would appear likely to spell the demise of the physician's control over his/her technology'.

Operational systems and monitoring and control systems are specifically a field where the Professional - Management conflict (section 2.2.3) should emerge. Professionals emphasise the individual discretion and indetermination of their work, while managers will tend to codify the work of the professionals and make it a subject of rationalisation, routinisation and control. Boreham (1983) calls this 'the dialectics of indetermination and rationalization'. Bucher and Stelling (1969) state that the reward for becoming a professional is the right *to define problems, determine solutions, and monitor the functioning of the system* (p. 4).

2.4.1.3   Decision and knowledge systems

Professional work involves the exercise of expert knowledge and autonomous professional judgments based upon experience. Developments such as decision support systems and knowledge based systems can affect these professionalised activities. While the earlier mentioned systems (operational systems and monitoring and control systems) influence the working conditions, these systems may affect the professionals' work itself. Haug (1977) asserts about this question:

> 'If it is accepted that the essence of the concept of profession in all societies rests in the control over a body of specialized knowledge, acquired through schooling, and, accordingly unavailable to the average citizen, one can ask whether recent social and technological developments are having any impact on that control. Is professional monopoly of knowledge being eroded?' (p. 218).

These developments are discussed in the so called 'deskilling debate' (Perolle, 1991). Some theorists observe a trend toward subordination of intellectual work and predict deskilling, 'proletarization of professionals' (Oppenheimer, 1973), and a declining middle class. McKinlay and Arches (1985) elaborated that statement with respect to physicians in their article *'Towards the Proletarization of Physicians'* (1985). They state:

> 'Computers can take more accurate and complex histories faster than physicians and also can complete a statistically more reliable physical

examination'

'Concerning the latter tasks of diagnosis, treatment and therapy, there are studies showing that computers can perform aspects of these tasks to a level of reliability better than that of even the most highly trained and up to date physician'

'In today's medicine, the physician's skill has been reduced to choosing the proper kind of technology for the patient, although it is clearly the technology that does the curing. In the future, the computer rather than the physicians, will be better equipped to make even these decisions' (p. 178-179).

Others emphasise that such systems will enhance the quality of working conditions of intellectual labour (including professionals) and freeing them for creative thought. The argument is that :

'creative intellectual activity is uniquely human and can never be automated. Routine thought processes that are amenable to mechanization are considered mental drudgery; optimizing highly skilled human capital is believed to be the appropriate managerial strategy for dealing with intellectual labour' (Perolle, 1991, p. 222-223).

Practical examples of systems which may affect the work of professionals are medical diagnosis systems, legal information systems, insurance acceptance systems, audit software for accountants, computer aided learning systems and systems which support the work of architects and engineers such as computer aided design systems. Most successes are reported from areas where human decision making is believed to be rational and logical and where the problem field is limited. Knowledge based systems can carry out tasks such as the interpretation of rough data, the judgement of requests and planning functions.

Such systems are specially applicable if manuals and information systems have to be consulted often during the performance of task prescriptions, if the knowledge which is necessary for that task changes very fast while the process itself stays stable, if the expertise which is necessary for a certain task is scarce and expensive and if the quality of the result varies strongly per employee (Dutch Organisation of Technological Research, 1991).

Examples of operational expert systems in medicine are systems which judge emergency calls and subsequently determine which actions have to be taken and systems which are called 'computer therapist'. Such systems support the diagnosis of psychologists and psychiatrists by asking questions of clients and by processing this information in the knowledge base (McCauly and Ala, 1992).

Some aspects are important and will determine the professionals' attitude toward such systems.

1 Decision and knowledge systems may have the capability to support the work of the professional and can make routine-tasks easier. E.g. important data can be stored and retrieved easily, repetitive work can be carried out in a more efficient way and unexpected suggestions can be done by the system. Some systems can help the professional to consider important information or can advise him/her to read relevant literature. It often improves the professionals' output: the report, the diagnosis, the argumentation, the judgement or whatever it may be. Many professionals will experience such supportive systems as helpful and useful if they are well designed: flexible, user friendly and directed to real user problems.

2 Such systems can be supportive and have to be handled by highly skilled professionals, or may have such capabilities that the process can be taken over by less skilled assistants. Freidson (1985) states about such systems with respect to professionals:

> 'Insofar as their formal knowledge can be stored in a computer, it loses its esoteric character because anyone can retrieve it' (p. 4).

Haug (1977) argues that

> 'the advent of the computer and its consequent diffusion of knowledge is a part of a process of disempowerment and deprofessionalization' (p. 227).

It is reasonable to suppose that professionals will support the first kind of systems (see 1), while they may have a reserved attitude towards the development and implementation of the second kinds of systems. It is interesting to consider that

knowledge engineers define many areas as relatively straightforward and possible to be automated (Perolle, 1991), while the specialists in these fields emphasise the indeterminability of their problems. This illustrates the threat of such systems toward some professional occupations. Hirschheim and Klein (1989) emphasise in this context the essential difference between an *expert system* and a *system for experts*. The first kind may replace certain human tasks by computer systems or may have a deskilling consequence, while the second kind makes experts (e.g. professionals) more effective and strengthens the level of their professionalism. Such systems can only be used effectively by people with a high level of expertise.

3 The process of implementation and use is important. If professionals are able to influence the design and the implementation of the system, and if they are free to use it if they wish, they may have a more positive attitude towards these systems. If they are obliged to use such systems and if it is imposed by the management, they may have a more reserved attitude or will resist.

4 McCauly and Ala (1992) argue that expert system technology may be a solution which is lacking an agreed (upon) problem. They state:

> 'Physicians, like many professionals, do not perceive that they have a deficiency of expertise or decision making ability within their own areas of specialty. In actual practice, when presented with an unusual or difficult case, they may call in a consultant physician for assistance with diagnosis and treatment planning. For a diagnosis which proves to be outside the original physician's area of expertise, it is highly unlikely that he or she would seek out a computer program for advice on how to manage a patient's care' (p. 230).

They believe that this historically grown working practice is the main reason for not breaking through any clinical use of expert systems, but also for the lack of standardisation of medical nomenclature and electronic medical records and storage and retrieval technology. It is relevant to wonder which interests are being served by certain expert systems and knowledge based systems. McCauly and Ala (1992) state that third party payers were identified as the most likely group to support system development of expert and knowledge based systems, for business

rather than clinical reasons.

5   Some commentators emphasise that the power of the professions involved is more important than the technical possibilities in relation to the development and implementation of such systems. Perolle (1991) states:

> 'The effects of computers on relatively powerful professions such as law and medicine depend less upon technical possibilities for expert systems than upon political and economic issues of professional autonomy, credentials, regulation, and the role of paraprofessionals. Mental labour is most likely to be subject to rationalization, control, and eventual automation in professions that allow their work to be done by less skilled assistants' (p. 229).

Finally, it is relevant to make an distinction between the small and active group of physicians who are interested in medical informatics (present in almost all hospitals) and (in many cases) the majority of physicians who perceive computer consultation as alien, unwanted and unnecessary, which should offer *'neither clinical benefits, increased revenue potential, nor time savings'* (McCauly and Ala, 1992, p. 233).

2.4.1.4   *Communication systems*

Communication systems have the augmentation of formal or informal and structured or unstructured communication among people as their primary function. Such systems attempt to transcend distance and make the operations independent of the location of people and resources (Markus, 1984). Many professionals may feel that their work will be supported by such systems. Sending messages or reports to colleagues or secretaries with the help of electronic mail (e-mail), making contacts with colleagues in other organisations, sending pictures (e.g. X-rays) by computer networks for examination to colleagues or analysts, facilitating communication with support staffers and/or customers are examples of applications of communication systems which can be helpful for professionals. Flexibility, user-friendliness, conscious and participative implementation and clear improvement of current communication are conditions which have to be fulfilled to make a success of such systems. A Picture Archiving and

Communication System (PACS) is an example of an application of communication systems in the practice of hospitals. Such systems digitalise and store diagnostic data, such as X-rays and CT scans, in a database which can be retrieved on the work stations by authorised physicians if they are needed.

2.4.1.5   *Interorganisational systems*

Interorganisational systems are intended to facilitate transactions involving more than one organisational entity (Markus, 1984). Interorganisational systems may have various aims: to improve operations (2.4.1.1), to monitor and control (2.4.1.2), to support decision making (2.4.1.3) or to augment communication (2.4.1.4). The difference is that the earlier mentioned systems (2.4.1.1 - 2.4.1.4) emphasised the operations within the organisation, while interorganisational systems widen the aims toward other organisational entities. The attitude of professionals toward such systems will depend on the primary aim of the interorganisational systems. These primary aims are discussed in the sections mentioned earlier. Electronic data interchange (EDI) among hospitals, general practices, dentists, paramedics and insurers is an example of the use of interorganisational systems in hospitals.

2.4.2 Assumptions with respect to the relation between the kind of professional organisation and information systems

The concept of different kinds of professional organisation has been elaborated in section 2.3.2. These kinds vary from a high level of professional autonomy (the autonomous professional organisation) to the professional organisation with higher levels of managerial control (the heteronomous professional organisation), with the conjoint professional organisation as an intermediate form. Section 2.4.1 described the expectations of the attitude of professionals toward information systems in relatively autonomous professional organisations. It is reasonable to expect that operational

systems and monitoring and control systems will occur more often in the more heteronomous professional organisations.

In some situations, the management may use the implementation of information systems as a means to increase their control and to move the organisation from a relatively autonomous form towards a more heteronomous professional organisation. In other situations, the management may use information systems to strengthen the current situation and to increase their grip on the organisation. Information systems may also be used by professionals to support their work as experts and to communicate in such a way that their position as a professional will be strengthened. It is reasonable to expect that information systems may be used as means to change the professional organisation in a certain direction (to more professional autonomy or to more managerial control) or to strengthen the current position. In this context information systems -among other things- are means of power (Boonstra, 1991a, 1991b; Keen, 1981; Kraemer et al., 1989; Markus, 1983a, 1984).

2.4.3   Assumptions with respect to the definitions of professionals and their attitudes toward information systems

In section 2.2, professionals are defined by three different approaches, the attributes approach, the power approach and the professional-management conflict approach. These approaches may be helpful for making assumptions of professionals toward information systems more explicit.

The attributes approach emphasised -among other aspects- expertise, autonomy and collegial maintenance of standards. The attributes 'expertise' and 'collegial maintenance of standards' may explain that professionals will have a positive attitude toward systems which help them to improve their expertise and their quality in maintaining standards; these will often be decision support systems or expert systems

(in the 'systems for experts' mode, Hirschheim and Klein, 1989, section 2.4.1.3). The threat from such systems may come from a too wide dispersion of their professional knowledge and demystification of their profession. This issue is discussed in section 2.4.1.3. The attribute 'autonomy' explains a possibly passive, half-hearted or resisting attitude towards operational systems and monitoring and control systems. Such systems may threaten the autonomy of professionals. This issue is discussed in the sections 2.4.1.1 and 2.4.1.2.

The power approach emphasises the aspect that professionals have a power basis which they try to expand or maintain. They will resist managerial or technocratic attempts to reduce that power basis. Operational systems, monitoring and control systems can be such attempts; professionals will be critical of such systems as a strategy to protect their power base. The management of professional organisations may try to implement such systems if they wish to increase their influence and their insight into the performance of the professionals in their organisation. On the other hand, professionals may use their power position to build up their own particular information systems and technical infrastructures which are not compatible with the administrative structures, in order to strengthen their autonomy and their level of professionalism.

Many information systems will be designed to improve organisational performance. The Professional - Management conflict approach emphasises that professionals are 'cosmopolitans'; they are not primarily interested in the performance of the organisation as a whole.

Many information systems in professional organisations may be directed towards the support staff. It may be an aim of some systems to rationalise, to routinise, to monitor, to control or to improve some work processes of the support staff. Mintzberg (1983a) states:

'what frequently emerge in the professional bureaucracy are parallel administrative hierarchies, one democratic and bottom-up for the professionals, and a second machine bureaucratic and top-down for the support staff' and 'In the nonprofession hierarchy, in contrast, power and status reside in administrative office; one salutes the stripes, not the man' (p. 198).

Professionals may support such systems if they get better services from the support staff through these systems. Professionals do not claim autonomy for the support staff, as they claim that for themselves. *'The support staff has to be managed by the administrators in such a way that they provide the best services'* will be the opinion of most professionals. This attitude can cause conflict in professional organisations. Mintzberg (ibid.) quotes Blau when he states:

'research indicates that a professional orientation toward service and a bureaucratic orientation toward disciplined compliance with procedures are opposite approaches toward work and often create conflict in organisations' (p. 198).

Information systems may play a role in this field of forces.

2.4.4 A model with respect to organisational impact of information systems in professional organisations

This section will summarise the discussion up to this point and will place the various definitions and categorisations in a model in order to provide an overview. That model will be called the 'Professional - Heteronomy model'.

Section 2.2 discussed the question of what a professional actually is, and concluded that (de)professionalisation is a process moving from non-professional to professional or vice versa. The vertical axis shows this continuum. The horizontal axis shows the level of administrative influence, which can be low in autonomous professional organisations and high in heteronomous professional organisations. The processes which cause a change in these states can be called *autonomisation* (increasing influence of professionals) and *heteronomisation* (increasing influence of

administrators). These continua are shown in figure 2.7. The figure also shows that the more heteronomous kinds imply a lower level of professionalism, because the high administrative influence is in contradiction with a high level of professional autonomy. In that sense the two axes are not completely independent of each other. A position in the upper left corner seems at least paradoxical.


```
                              PROFESSIONAL
                                   ▲
                                   │

           ↑   ↑   ↑    ↑   ↑   ↑
          │professionalisation│
                   │                      .................
                   │                      ..autonomous.....
                ...............           ..professional...
                ..conjoint.......         ..organizations..
                ..professional...         .................
 ...............  ..organizations..
 ..heteronomous...  .................
 ..professional...
 ..organizations..
 .................
                  ┌─────┐        ┌─────┐
                  │hetero│        │auto-│
HETERONOMY ◄──────┤─nomi├────────┤nomi-├──────────────────►  AUTONOMY
(high managerial  │sation│       │sation│                   (low managerial
 influence)       └─────┘        └─────┘                     influence)

                  ┌─────────────────┐
                  │deprofessionalisation│
                  │  │   │   │   │   │
                  ↓   ↓   ↓   ↓   ↓

                              NON-PROFESSIONAL
                                   ▼
```
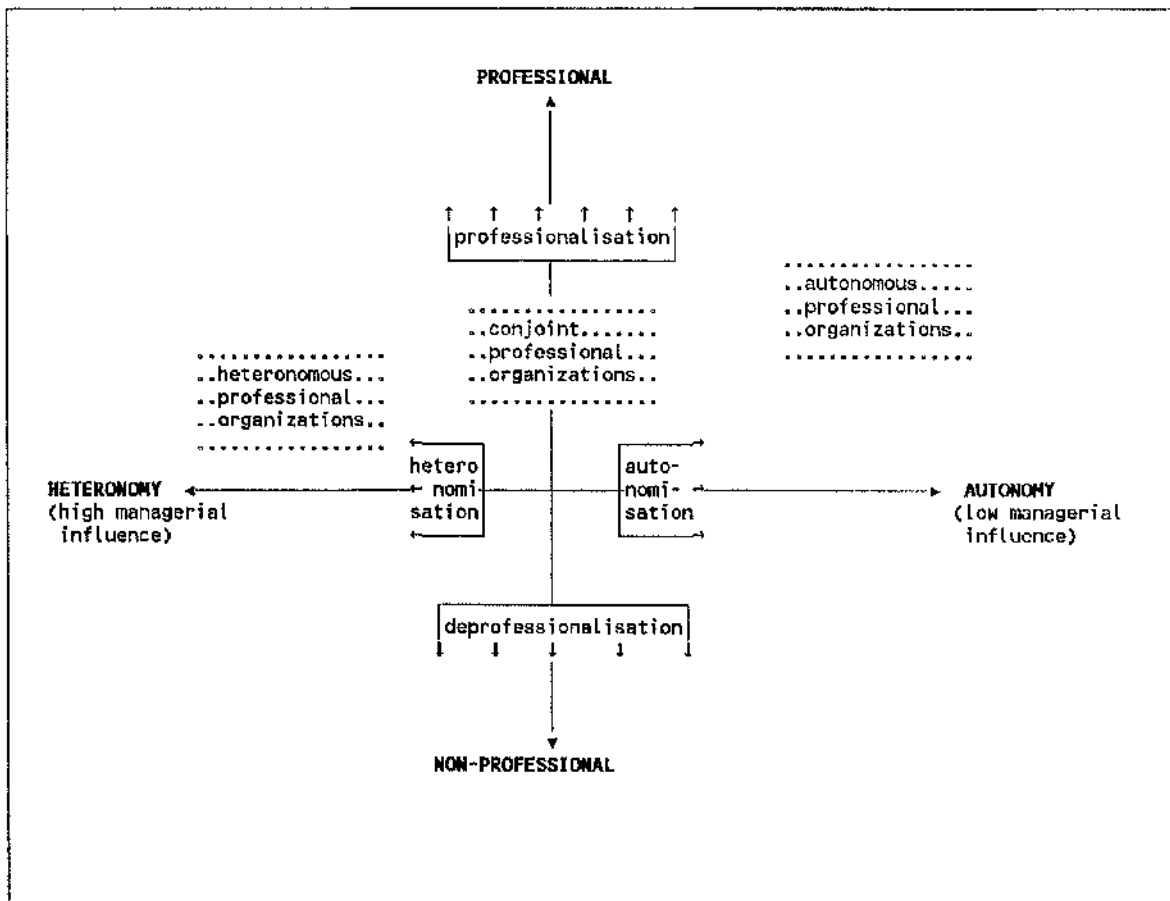
Figure 2.7   The Professional - Heteronomy model: Professionals, kinds of professional organisations and possible organisational changes

Figure 2.8 shows the same dimensions as figure 2.7, but the various kinds of systems which are discussed in section 2.4.1 are put in this figure in order to show how systems can support certain kinds of organisational change in professional organisations. Monitoring and control systems are often means for heteronomisation: an increasing

managerial influence. Operational systems for registrative and administrative purposes may have the same objective, but can also have a lower influence on the work of professionals if they are mainly used by the support staff. Communication systems and 'systems for experts' may strengthen the level of professionalism, as discussed in subsection 2.4.1.3 and 2.4.1.4, while certain expert systems may have a deprofessionalising consequence. The fourth direction ('autonomisation') implies a practice of decentralisation of decision making power with respect to information systems to the individual professionals or to groups of professionals.

Figure 2.8 puts the various information system policies into words in order to make this more clear for discussion purposes. The various policies can be described as:

1 Heteronomisation policy: *'control them'* or *'monitor them'* through monitoring and control systems.

2 Autonomisation policy: *'support them'* or *'leave it to them'* through decentralisation and self determined systems.

3 Professionalisation policy: *'facilitate them'* through the development of systems for experts and communication systems and

4 Deprofessionalisation policy: *'replace them'* through the development of replacing expert systems.

```
                          ┌──────────────────┐
                          │   PROFESSIONAL   │
                          └──────────────────┘
                                   ▲
                                   │
                       SYSTEMS     │ 'facilitate
                    FOR EXPERTS     │  them'
                                   │
                   COMMUNICATION    │
                      SYSTEMS       │
                                   │
     'control      'monitor     'do│      'support    'leave it
      them'         them'    nothing'       them       to them'
┌──────────┐                       │                          ┌──────────┐
│HETERONOMY│◄──────────────────────┼─────────────────────────►│ AUTONOMY │
└──────────┘  MONITORING & CONTROL │ OPERATIONAL &   SYSTEMS DEPEND ON└──────────┘
              SYSTEMS              │ ADMINISTRATIVE  PROFESSIONALS
                                   │ SYSTEMS        INVOLVED
                                   │
                                   │
                       EXPERT      │ 'replace
                       SYSTEMS     │  them'
                                   │
                                   ▼
                          ┌──────────────────┐
                          │ NON-PROFESSIONAL │
                          └──────────────────┘
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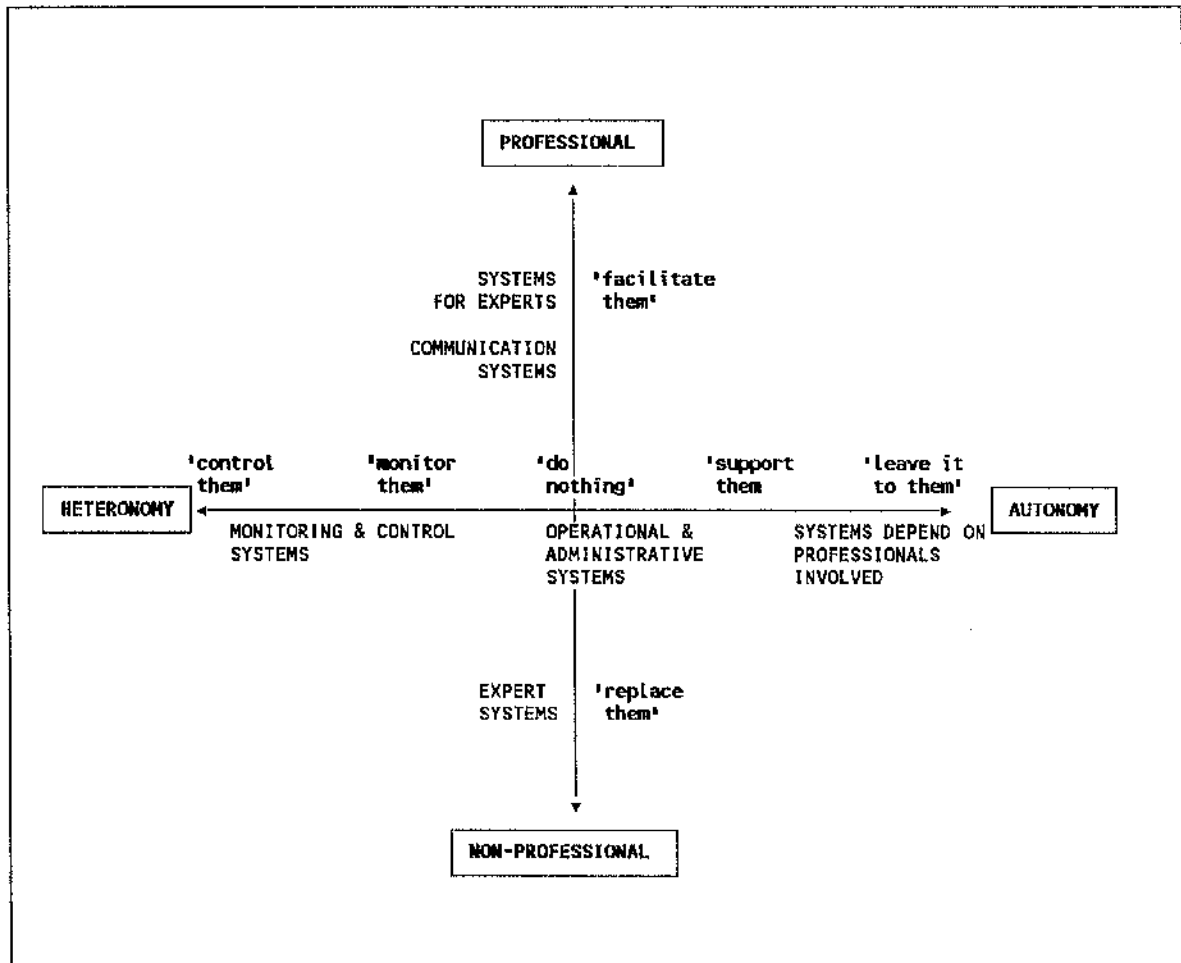
*Figure 2.8   The Professional - Heteronomy model: professional organisations and
organisational change through information systems*

These various IS policies seem to be conflicting and contradictory, but in practice, these various directions may be carried out simultaneously. This practice will be discussed in chapter 9. The case studies aim to illustrate these processes more clearly and attempt to increase insight into the organisational impact which information systems may have in professional organisations. The suggestion is that there are many alternatives in using information systems and that use of systems will depend on a certain organisational strategy of the various stakeholders.

2.4.5   Implementation of information systems as means for organisational change

The discussion in section 2.4 deals with the possible impact of certain information systems in professional organisations. This viewpoint emphasises to a great extent the organisational consequences of information systems and demands managerial attention for this way of considering the various possibilities and building up the applications portfolio.

From a technical viewpoint, most directions for use may be possible in (professional) organisations. But it is essential to discuss these issues from the point of view of the desired strategic directions of the organisation. Figures 2.7 and 2.8 conceptualise the various possibilities. Each professional organisation may invent concrete examples of each direction. An assessment of each example from various viewpoints, e.g. strategic alignment, acceptability, technical feasibility can strengthen the final decision with respect to the application portfolio.

2.5   OTHER KINDS OF ORGANISATIONS

Many organisations, -also basically professional organisations- are hybrid, in the sense that they will not fit for 100 percent in the model of a professional organisation. A number of studies emphasise fluidity and change of organisations in the sense that various pressures influence its characteristics (figure 2.10 illustrates these forces). Therefore, it is likely that the characteristics described here as typical for professional organisations may occur in other organisations as well. Mintzberg (1979a, 1983a) distinguishes five basic structures and many organisations will be a mix of these. These five basic structures are based on the five organisational parts, as shown in figure 2.3. Each of these parts tries to influence the organisation in a way that serves the interests of that group in the best way.

The strategic apex has a pull to centralise, the technostructure has a pull to standardise, the support staff has a pull to collaborate, the middle line has a pull to balkanise and the operating core has a pull to professionalise (Mintzberg, 1983, p. 286). This leads to five possible coordination mechanisms and five pure types of organisation. These coordination mechanisms are 1) *mutual adjustment* (informal communication), 2) *direct supervision* (a person gives orders to others), 3) *standardisation of work processes* (programming of the content of work directly), 4) *standardisation of outputs* (specification of the results) and 5) *standardisation of skills* (the worker rather that the work or the outputs are specified). Figure 2.9 shows the five basic configurations, their primary coordination mechanism, its organisational key part and its type of decentralisation.

CONFIGURATION	PRIME COORDINATING MECHANISM	KEY PART OF ORGANISATION	TYPE OF DECENTRALISATION
Simple structure	Direct supervision	Strategic apex	Vertical and horizontal centralisation
Machine bureaucracy	Standardisation of work processes	Technostructure	Limited horizontal decentralisation
Professional bureaucracy	Standardisation of skills	Operating core	Horizontal decentralisation
Divisionalised form	Standardisation of outputs	Middle line	Limited vertical decentralisation
Adhocracy	Mutual adjustment	Support staff	Selected decentralisation

Figure 2.9   *Five configurations (Mintzberg, 1979a, 1983a)*

Beside these five basic configurations, Mintzberg later expanded on the *missionary organisation*, with standardisation of norms as coordination mechanism and ideology as key part and the *political organisation* without a clear coordination mechanism or a key part (Mintzberg and Quin, 1991). Mintzberg proposed these five (and later seven)

configurations as basic forms; not every organisation fits completely as one type. The five forms can also be viewed as forces:

Simple structure
force to direction

Machine bureaucracy		Professional bureaucracy
force to efficiency		force to proficiency

Divisionalised form		Adhocracy
force to concentration		force to innovation
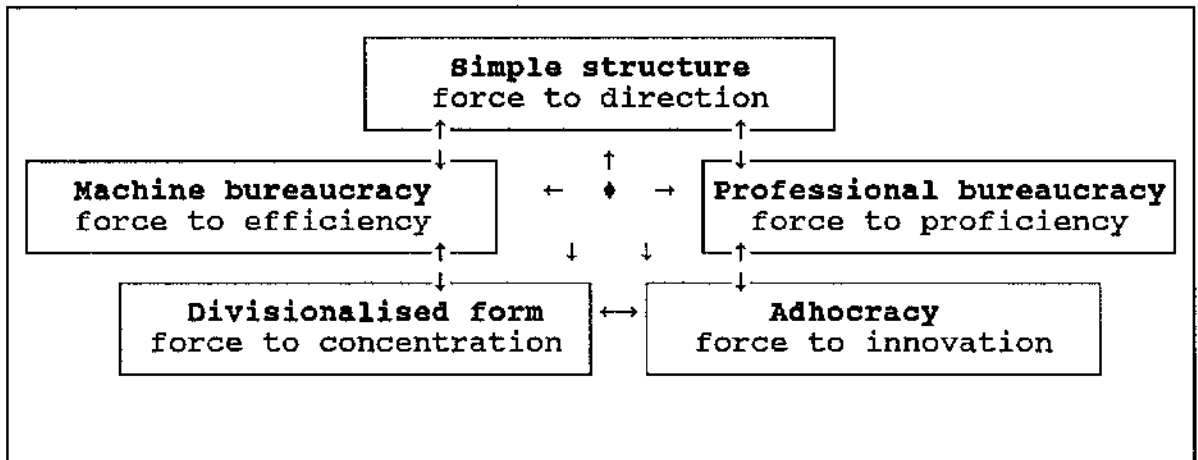
Figure 2.10   Forms and forces (Mintzberg, 1989)

During its history, an organisation can move from one configuration to another. Becoming older, becoming larger, a changing environment, a changing core business and possibly other factors can be explanatory components in these moves. It is also possible that one organisation has characteristics of more than one structure, e.g. in a large ministry in The Netherlands (4500 employees), an adhocracy could be observed at the policy part of the organisation while a machine bureaucracy could be observed at the executing part (Frissen, 1989).

Different forces (from inside and outside) attempt to affect the organisation and the organisational performance in various ways. This makes it hard to call a certain organisation a pure machine bureaucracy, a pure adhocracy or a pure professional organisation. It is not easy to operationalise these terms and to fix a complex social system in one box. Nevertheless, one can suppose that a certain organisation or an organisational part is e.g. more or less a machine bureaucracy, or a mix of an adhocracy and a professional organisation.

CHAPTER 3

ASSESSMENT OF CURRENT APPROACHES TO INFORMATION MANAGEMENT

3.1   INTRODUCTION

In section 1.5, the development of thinking in the field of information management was outlined. Developments such as high failure rates, competitive capabilities and high expenditure led to information technology becoming a more frequently arising issue on the agenda of general management. Various authors argue that 1) the involvement of the top management of organisations and 2) the alignment of the corporate strategy with the use of IT are critical for successful and effective use of information technology.

Strategic Information Systems Planning Methodologies (e.g. Lederer and Sethi, 1988) were developed in order to help managers to become more involved in the management of information systems and to align the company policy with the use of IT applications. These methods are designed to help managers to make the essential choices in the field of IT policy and to prioritise various information system possibilities. This chapter discusses some of the most popular planning methodologies and approaches more closely in order to derive their basic assumptions with respect to organisations. These approaches are:

1   Business Systems Planning (IBM, 1984), discussed in section 3.2.1;

2   Critical Success Factors (Rockart, 1979; Rockart and Creszenci, 1984; Rockart and Delong, 1988), discussed in section 3.2.2;

3   Information Engineering (Martin, 1985), discussed in section 3.2.3;

4   Stages Approach (Nolan, 1973, 1974, 1979), discussed in section 3.2.4;

5   Value Chain Analysis (Porter and Millar, 1985), discussed in section 3.2.5.

These approaches to information planning and information management will be discussed in section 3.3. Section 3.4 suggests some alternative approaches and section 3.5 connects this chapter with the central theme: information management in professional organisations.

3.2   DISCUSSION OF VARIOUS INFORMATION MANAGEMENT APPROACHES

3.2.1   Business Systems Planning

Business Systems Planning (BSP) was initially developed for IBM's internal use in the early 70's, but as customers expressed an interest, BSP was released as a general methodology. BSP was perhaps the earliest formal systems planning method and is widely known. There are a number of methodologies which are BSP-like e.g. Arthur Andersen & Co's METHOD/1 and James Martin's Information Engineering (IE), (Pruijm, 1990). The information engineering method will be discussed in section 3.2.3.

The basic philosophy of BSP is that data is a corporate resource. As such, it should be managed from an overall organisational viewpoint, so that it can best serve the organisation's objectives and support its decision making activities (Boynton, 1987). The BSP-method involves top-down planning with bottom-up implementation. In this methodology, a firm recognises its business mission, objectives and functions, and how these determine its business processes. The processes are analysed for their data needs, and data classes are then identified. Databases are developed by combining similar data classes. The final BSP-plan describes an overall information system architecture as well as the installation schedule of individual applications.

The goal of BSP is to discover a stable information architecture that supports all of the

processes of the business which can be computerised. When this architecture has been defined, the bottom up implementation of specific applications is carried out by the information systems department and the organisation's users. Bottom up implementation involves the users in operational decisions with respect to new systems; top down planning establishes a sequence of implementation consistent with long term objectives.

Described in the BSP-handbook (IBM, 1984) are thirteen steps in the method, two of which are preparatory to the actual study.

1 Gaining Executive Commitment
> A top executive sponsor and various other interested executives are identified as the major sources of information in the study. A team leader, perhaps the sponsor, is identified to work full time leading the study team of 4 to 7 executives.

2 Preparing for the Study
> Team members are trained in BSP. They compile data on the firm's business functions and current IS support, and produce a work plan, an interview schedule and final report outline.

3 Starting the Study
> The executive sponsor reviews the study's purpose with the team. The team leader reviews the compiled business data and the top IS executive explains recent IS activities and problems to the team.

4 Defining Business Processes
> The study team identifies the business processes which form the basis for executive interviews, the definition of the future information architecture, and other study activities.

5 Defining Data Classes
> Data are grouped into categories called data classes based on their relationships to the business processes identified above. Charts are built to reflect those relationships.

6 Analysing Current Systems Support
> The study team identifies how IS currently supports the organisation. The team develops charts showing organisational processes and responsible departments.

7 Determining the Executive Perspective

   Executive interviews gain the commitment of additional executives and help the study team understand the problems whose solutions will be represented by the future systems.

8 Defining Findings and Conclusions

   The study team develops categories of findings and conclusions and classifies previously identified problems into categories.

9 Defining the Information Architecture

   The study team uses the business processes and the data classes to design databases. The team prepares charts relating the processes to the classes and the systems to subsystems.

10 Determining Architectural Priorities

   The team sets systems development priorities bases on potential financial and non financial benefits, the likelihood of success, and the organisation's demand for each system.

11 Reviewing Information Resource Management

   The study team evaluates the current IS organisation's strengths and weaknesses. A steering committee is established to set policy and control the function.

12 Developing Recommendations and an Action Plan

   The team prepares an action plan with recommendations about hardware, software, adjustments to current systems, and methods of strengthening IS management.

13 Reporting Results

   The study team gives a talk along with a brief summary and a more detailed (usually very thick) report covering the study's purpose, methodology, conclusions, recommendations and prescribed actions.

In order to make a BSP planning process more clear, some of the steps are explained through an example of a hospital. Step 4, the definition of business processes may result in a list like figure 3.1.
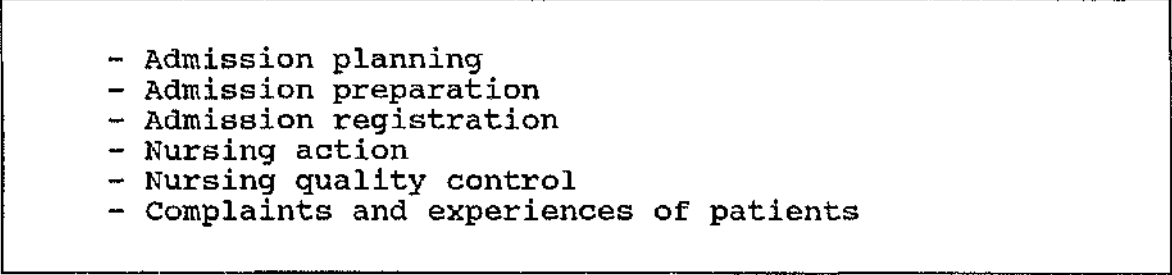
```
         - Admission planning
         - Admission preparation
         - Admission registration
         - Nursing action
         - Nursing quality control
         - Complaints and experiences of patients
```

Figure 3.1   Examples of processes in a hospital

Many of these business processes are connected with data; reliable data are needed to carry out a certain process in a proper way. E.g., when a new patient has to be registered, the process *admission registration* will need the data *patient, bed occupation, department* and *responsible specialist.* These needs have to be identified in step 5, as shown in figure 3.2.
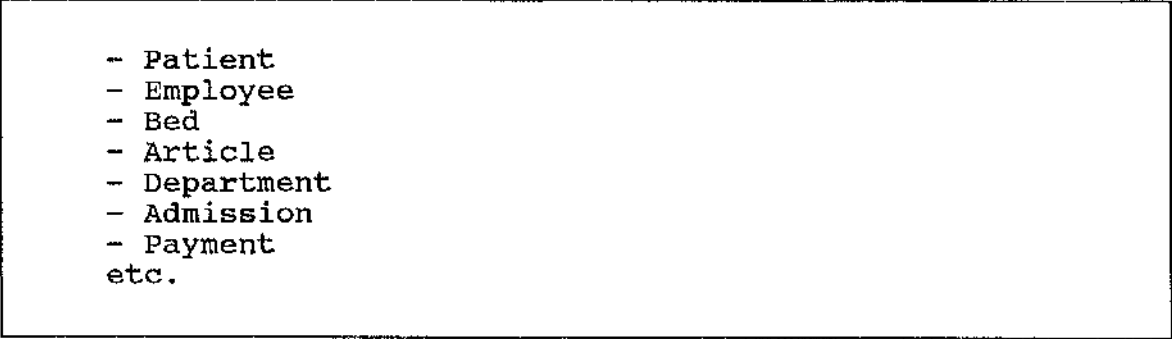
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         - Patient
         - Employee
         - Bed
         - Article
         - Department
         - Admission
         - Payment
         etc.
```

Figure 3.2   Examples of data classes in a hospital

After these - often labour intensive - planning activities, current applications have to be identified (step 6). These systems can be placed in the combination table of figure 3.1 and 3.2:

```
Data classes    ...    ...    ...    ...
Processes

...
...    ┌─────────────┐                    ┌─────────────┐
       │Patients     │                    │Personnel    │
       │information  │                    │information  │
       │system   ┌───┴──────────┐         │system       │
...    └─────────┤              │         └─────────────┘
...              │Treatments    │
...              │information   │
               │system        │
...            └──────────────┘
...
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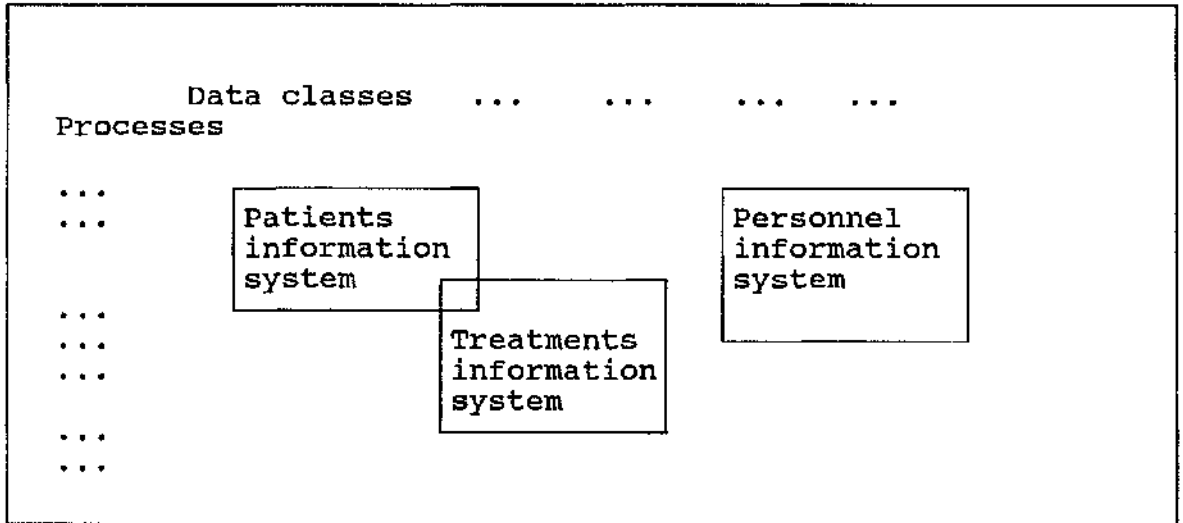
Figure 3.3   Current systems support

The current systems support will be discussed and evaluated. In the situation above, the overlap between the patients information system and the treatments system will probably be an issue to discuss. Another point is that some existing processes are not supported by information systems and that there are data classes which are not registered in a formal information system. The conclusions of these discussions have to lead to a proposal for a solution (step 7 and 9, figure 3.4).
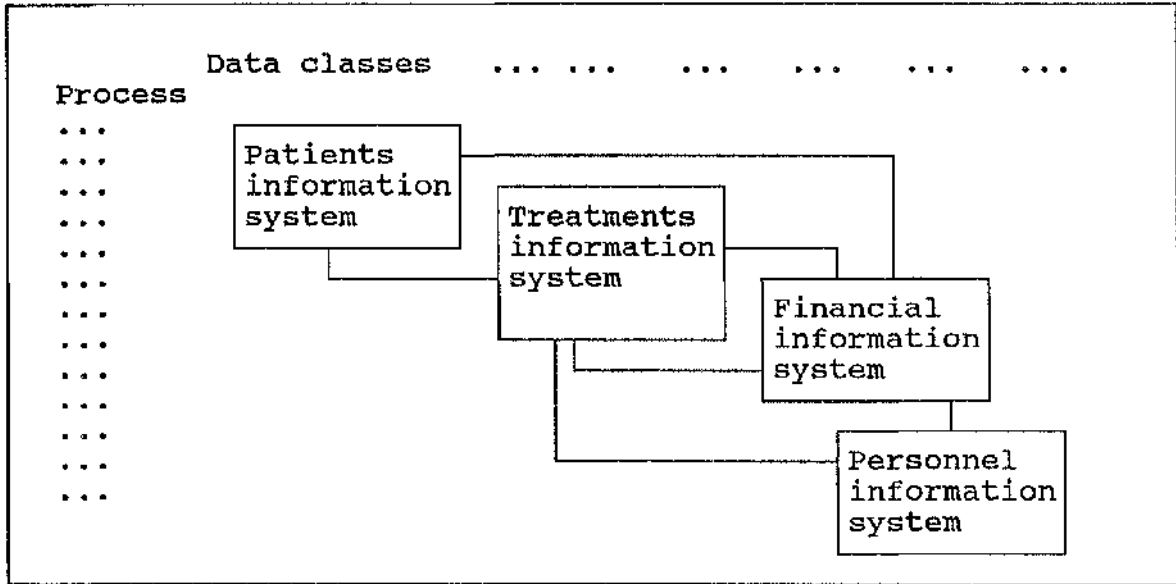
Figure 3.4   Proposed system support

This proposal will contain different systems (they have already been described on a global level) which are complementary to each other and often connectable (see the lines between systems) in order to make it possible to interchange data between the proposed systems. In step 10 a priority-proposal will be made; this will result in a figure like 3.5:
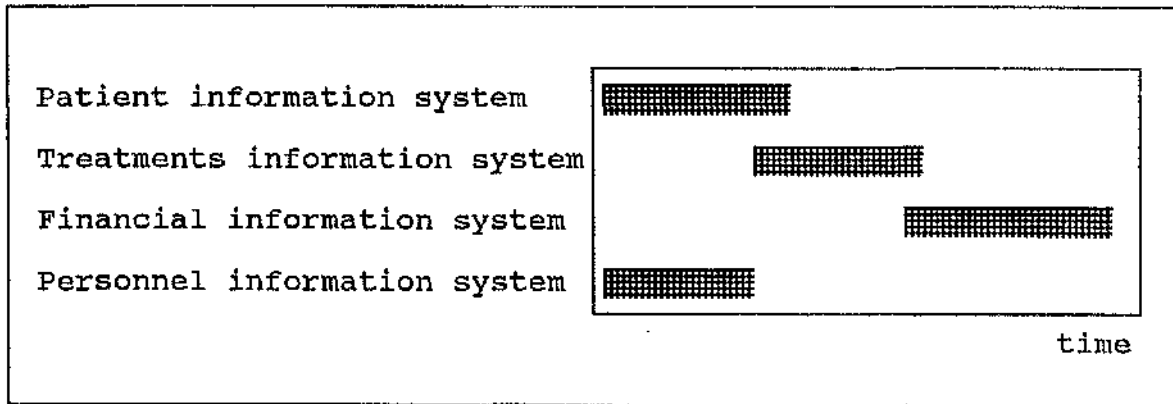
Figure 3.5   Determining architectural priorities

Step 11 is aimed at evaluating the IS-function of the hospital. It is possible that the

steering group decides to reorganise this function in order to realise the information plan. In the 12th and 13th steps, explicit recommendations can be articulated and reported.

Discussion of the Business Systems Planning methodology

An important strength of Business Systems Planning method is that it attempts to involve top management in the study (steps 1, 2, 3, 4, 7, 11 and 13). Implementation of information plans often progressed in a tiresome fashion when somebody else than a member of the Board bears the final responsibility (Lederer and Sethi, 1988). By involving top management, a strong relationship between a company's strategy and its information policy may be expected.

In this light it is remarkable that as many as 53% of the BSP users still have difficulties in securing top management commitment to their studies (Lederer and Sethi, 1988). Perhaps the amount of paperwork with often very detailed schemes and the data-driven characteristics will not be stimulating factors. In practice, specialists are nearly always needed (often external consultants and inside IS-professionals) in order to carry out the study in a right manner. This need for specialists encourages IS-function driven IT-planning. An important limitation is that BSP is meant for companies where the IS-function is organised in a relatively centralised manner. The methodology does not help an organisation to decentralise its computing resource; especially the top-down approach in planning enables only lower levels in the hierarchy to influence operational decisions during the design and building of information systems.

BSP supports prospective system development activities. Other ways of using IT, e.g. office-automation, use of software packages and more unstructured functions (such as decision support systems) and isolated functions (e.g. a knowledge based system which supports one function in an organisation) are not taken into account.

Vitale, et al. (1986) distinguished two different approaches during the information planning process. Firstly one can try to align the prospective systems with projected needs of the organisation. They call this the *alignment approach*. Secondly, it is possible to use information systems in innovative ways to build barriers against new entrants, to change the basis of competition, to generate new products or to change the balance of power in supplier relationships (McFarlan, 1984; Porter, 1985). This can be called the *impact-approach*, because it is an attempt to impact organisational strategies. According to this distinction, BSP is certainly an alignment-method; it searches continuously to align IT applications with business needs.

A BSP-study delivers a proposed situation (a *blueprint*) which has to be implemented in the medium-term. The BSP-approach assumes that uncertainty can be removed by detailed top-down planning. It is doubtful how realistic this assumption will be in practice. Information systems planning is viewed as simply a technical change with a number of components (including people). For this reason we can question the effectiveness of this approach when organisations have to cope with turbulent environments. An important characteristic of BSP is the top down planning approach, based on executives' data needs. These needs are derived from the objectives of a company. Other organisational characteristics such as the positions of various interest groups, the organisational culture, the organisational level where most decisions are made, the characteristics of the organisational structure and the probability of interorganisational networks are not taken into account. From that point of view, BSP is uni-perspectival, mechanistic and rationalistic; the concept of bounded or limited rationality of organisational science is not taken into account (Simon, 1957; March and Simon, 1958).

3.2.2 Critical Success Factors

In 1977, Rockart and his colleagues began developing a method for defining executive

information needs. The result of their work is the Critical Success Factors (CSF)-method, which is expanded in the famous article in Harvard Business Review: *'Chief Executives Define Their Own Data Needs'* (Rockart, 1979). It focuses on individual managers and their current information needs. The CSF-method can be used to help companies identify information systems they need to develop.

For each executive, critical success factors are the few key areas of the job where things must go right for the organisation to flourish. There are usually fewer than ten of these factors that any executive should monitor. Further, they are very time dependent, so they should be reexamined as often as necessary to keep abreast of the current business climate. These key areas should receive constant attention from executives.

Rockart suggests that there are four sources for these factors. One source is the *industry* that the business is in. Each industry has CSF's that are relevant to any organisation in it. A second source is the *company* itself and its situation within the industry. A third source of CSF's is the *environment*, such as consumer trends, the economy and political factors of the country the organisation operates in. The fourth source is *temporal* organisational factors - areas of company activity that normally do not warrant concern but which are currently unacceptable and need attention.

In addition to these four sources, Rockart argues that there are two types of CSF's. One he calls *monitoring* - that is, keeping abreast of ongoing operations. The second he calls *building* - tracking progress of programs for change, initiated by the executive. The higher an executive is in the organisation, the more building CSF's are usually on his or her list. A user of the CSF method makes the following statements (Butler Cox Foundation, 1985):

> 'Imperial Chemical Industries (ICI) was one of the first companies to use formal planning methods, such as IBM's BSP and Nolan's Stages of Growth. Looking

back, ICI now regards those methods as slow and clumsy. They took months to carry out and years to implement. More often than not the results were out of date by the time they were available, and there was little involvement of the top management. As a result, strategic systems planning went out of fashion in ICI in the late 1970's.

In the 1980's the company's renewed economic health created a fresh interest in systems planning. This time the emphasis was on finding an approach that would involve top management personally, would direct attention to the important issues rather than the long term, and would produce plans that could be complemented rapidly before changes in business requirements made the result irrelevant. As a result, Rockart's critical success factors method was selected for further evaluation.

Since the autumn of 1984, ICI has carried out four major CSF-based systems strategy studies. ICI believes that the strengths of the CSF method are that it is rapid, it brings together management services staff and users in a non-threatening, non technical context, and it focuses attention on how systems can support the issues that are most important. Its greatest strength is that it has proved tremendously useful in helping to clarify business issues'

In order to connect the CSF-approach with information systems planning, Rockart and Crescenzi (1984) developed a three staged approach. This is reflected in figure 3.6.
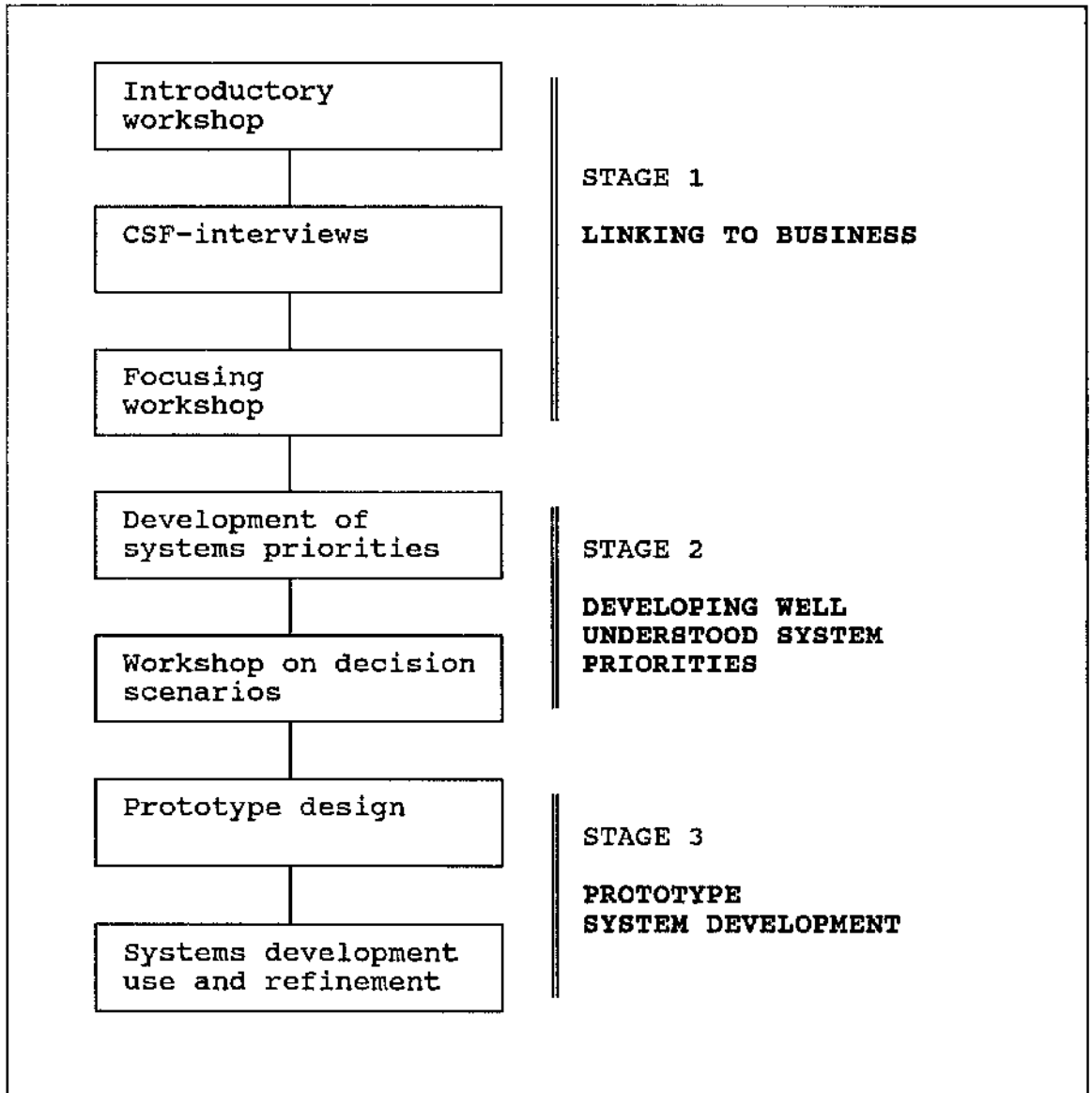
Figure 3.6   A three stages approach for information systems planning, based on the CSF-method (Rockart and Crescenzi, 1984)

By this approach, the definition of objectives, tactics and CSF's have to lead to derivation of operational activities and the identification of both the internal and external information required by those operational activities and for performance measurement. This sequence is illustrated in figures 3.7. In this way is a CSF analysis an important part of the strategic planning of information technology.

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                    ┌─────────────────────┐
                    │      Mission        │
                    └─────────────────────┘
                               ↓
                    ┌─────────────────────┐
                    │     Objectives      │
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                               ↓
        ┌──────────►┌─────────────────────┐
        │           │      CSF's          │
        │           └─────────────────────┘
        │                      ↓
        │           ┌─────────────────────┐◄─────────┐
        │           │    Operational      │          │
        │           │    activities       │          │
        │           └─────────────────────┘          │
        │                      ↓                      │
        │           ┌──────────┬──────────┐          │
        │           │ Internal │ External │          │
        │           ├──────────┴──────────┤          │
        │           │     information      │          │
        │           └─────────────────────┘          │
        │                      ↓                      │
        │           ┌─────────────────────┐          │
        │           │    Performance      │          │
        └───────────│    measurement      │──────────┘
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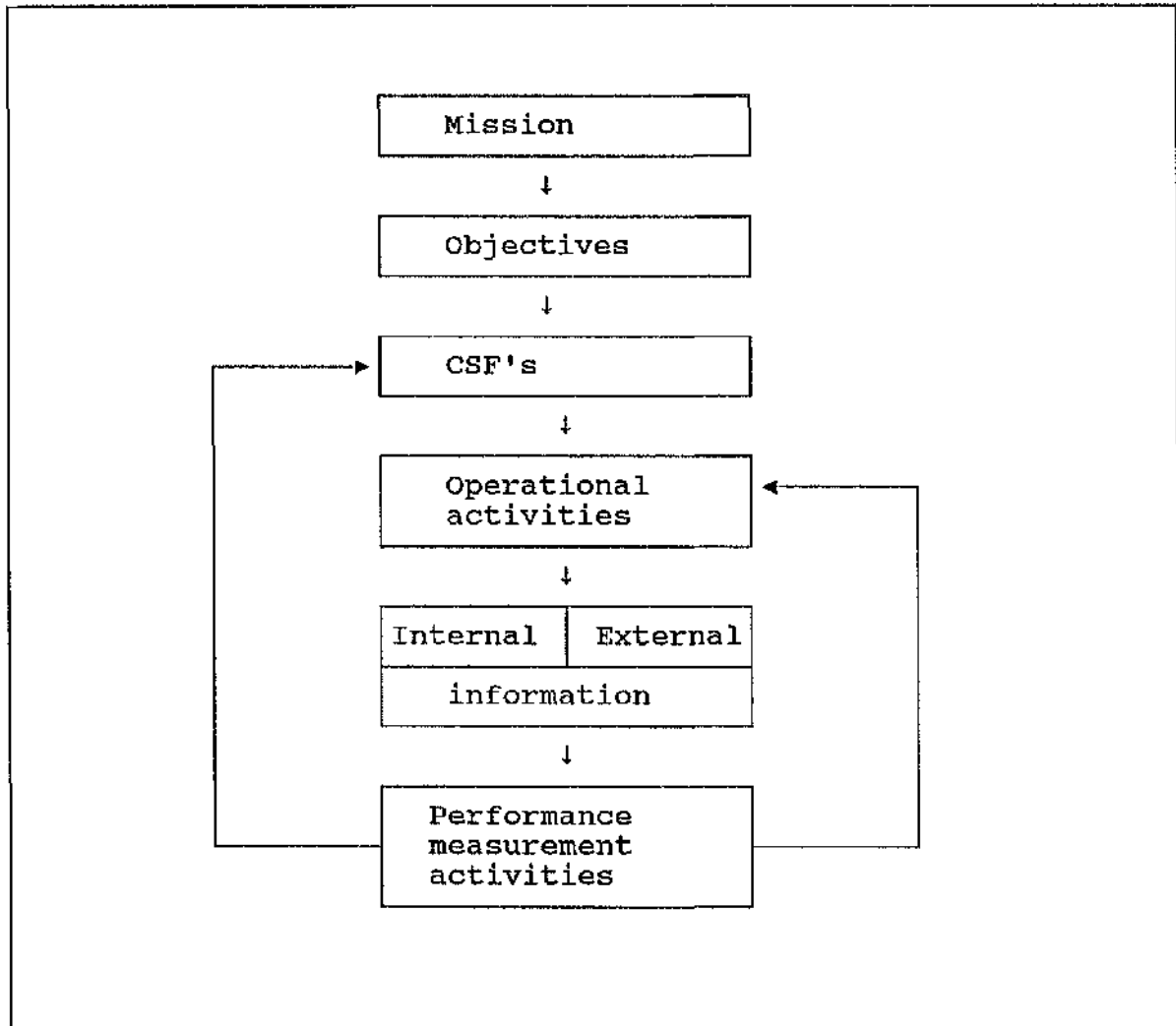
Figure 3.7   Linkage of mission, objectives and CSF's with information needs (based on Ward et al., 1990)

In order to make the CSF method more clear, it can be applied in the situation of a certain hospital. After an explanation of the CSF-method by an external consultant, the management of the organisation tries to identify their critical success factors, partially based on the mission of the hospital and the organisational objectives. Shown in figure 3.8 are some examples of critical success factors, derived from organisational goals.

Critical success factors:

Devise method for obtaining valid data on current status
of hospital operations

Manage external relationships (government, university,
health insurance organisations)

Strengthen management support

Meet budgetary constraints, efficiency in operations

Improve relationships with government and assurance
companies

Figure 3.8   Examples of CSF's of a hospital (Rockart, 1979)

The second stage is for developing well understood system priorities which are based
on the CSF's. The required systems have to be identified. A by-product of this process
is that managers develop the confidence that the systems will accomplish the intended
objectives. Figure 3.9 shows an example of this second step.

Critical success factors
1   Devise method for obtaining valid data on current
       status of hospital operations
2   Manage external relationships (government, university,
       health insurance organisations)
3   Strengthen management support
4   Meet budgetary constraints, efficiency in operations

New information systems
Patients-information system (including treatments)
           supports 1, 2, 3 and 4
Financial system linked with patients-information system
           supports CSF 2 and 4
Management-information system, linked with the other two
           supports CSF 2 and 3

*Figure 3.9   Examples of CSF's of a hospital related with information system
            requirements*

The key technique to define the requirements of these systems is the use of decision scenarios. During the study, the consultants identify recurring decisions and the questions which the managers ask themselves and others while making these decisions. In the third stage prototypes are made and the actual system development takes place.

Discussion of the CSF-method

The CSF method has a number of features which are valuable. Because the method starts with the identification of critical success factors, the relationship with the company policy as a whole and the organisational objectives is very strong. In contradiction to BSP, we can call this method an impact-method in the terms of Vitale (Vitale et al., 1986). The method is easy to understand for non IS-specialists and promotes creativity and unconventional thinking. Through these features, the influence of IS-professionals and/or external consultants will not be as strong as with the BSP-study. The method is especially helpful in designing support systems for senior executives. Here lies its greatest strength. A weakness is that the method lacks tools to resolve company-wide issues of information systems support.

As opposed to BSP, the CSF-method is global. It is not a blueprint for many years, but can be characterised as a development plan. Many details have to be filled in. In this context, it is a managerial method and it perceives the organisational environment as moving and changing continuously.

Similarly with the BSP-method, there is one perspective in the CSF-study: top down, derived from the organisation's objectives. Other perspectives such as internal political analysis, corporate culture, the organisation's learning curve and a risk analysis are not explicitly taken into consideration. It is a centralised approach and the supply of the top executive's data needs are the ultimate goal. Decentralisation and the information needs of middle managers are not taken into account explicitly. Involvement of other stakeholders of prospective systems is not proposed by this method. Finally, many

specialists perceive the method as relatively open and unstructured, it should lack rigour and structure.

3.2.3 Information Engineering

The consultancy firm *James Martin Associates* developed the Information Engineering Methodology (Martin, 1985; Martin and Hershey, 1986; Martin and Leber, 1989). This approach claims to be a general purpose method for the development of information systems. This method contains the whole range of activities from strategic planning to the implementation of build systems. The first stage of these activities is the Information Strategy Planning (ISP), followed by the Business Area Analysis. This Business Area Analysis is an elaboration of the strategic vision into a detailed architecture and a project plan for the development of information systems. This analysis may finish in a BSP-like report as described in section 3.2.1. The first set of activities, the information systems planning (ISP) stage, consists of six phases: 1) the development of an enterprise model, 2) the development of an entity model, 3) the definition of business areas and goals, 4) the establishment of critical success factors, 5) the analysis of the existing applications and 6) the prioritisation for information systems development (Martin and Hershey, 1986).

Other tasks are the analysis of the IS organisation, the technical needs and the design of the so-called information architecture. Martin (1985) has defined Information Engineering as follows:

> 'An interlocking set of formal techniques in which enterprise models, data models, and process models are built up in a comprehensive knowledge base and are used to create and maintain data processing systems. These techniques depend on highly automated tools. The result is systems built with strong end-user participation, which solve local problems, but which have horizontal integration so that they work together, and vertical integration so that data processing systems are anchored into the top management goals and strategic plans of the enterprise' (p. 3).

In an IE-study, business functions are identified and broken down in (usually hundreds of) business processes. These processes are broken down into activities. Of each business process and activity the responsible individuals have to be identified and the data that are used for that process have to be analysed. These data are grouped into data classes and related with business processes in order to make the business information model. From that model, an information systems architecture can be derived. The hardware and software architecture (the technical infrastructure) and the human architecture (the organisation related to information technology) are designed based on requirements derived from the information systems architecture.

Discussion of the IE-method

This approach can be seen as a combination of the BSP method, as discussed in section 3.2.1 and the CSF method as discussed in section 3.2.2. The approach attempts to use the strategic objectives of an organisation and its critical success factors as the major starting point. Derived from that, a detailed systems description will be designed, as well as a prioritisation proposal. For these reasons, IE can be called a top down-bottom up approach. Figure 3.10 illustrates this.

Such a method can be characterised as putting a high emphasis on strategic and competitive aspects, but because of its technical orientation, it is in many cases still driven by the IS function or by external consultants with an IS specialisation (Boynton, 1987). This method can be characterised by the key words strategy, technology and infrastructure. The approach does not pay much attention to a political analysis, a learning analysis or a cultural analysis. Besides, it may be doubted whether non-specialists can become highly involved during a complete IE planning project through

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┌─────────────────────────────────────────────────────────────────────────┐
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│  │ Objectives             │        :        │    Objectives          │    │
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│  ┌───────┴────────────────────┐    :        ┌───────────┴────────────┐    │
│  │ Organisation structure     │    :        │ Business processes      │   │
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│            PLANNING                 :        DEVELOPMENT                   │
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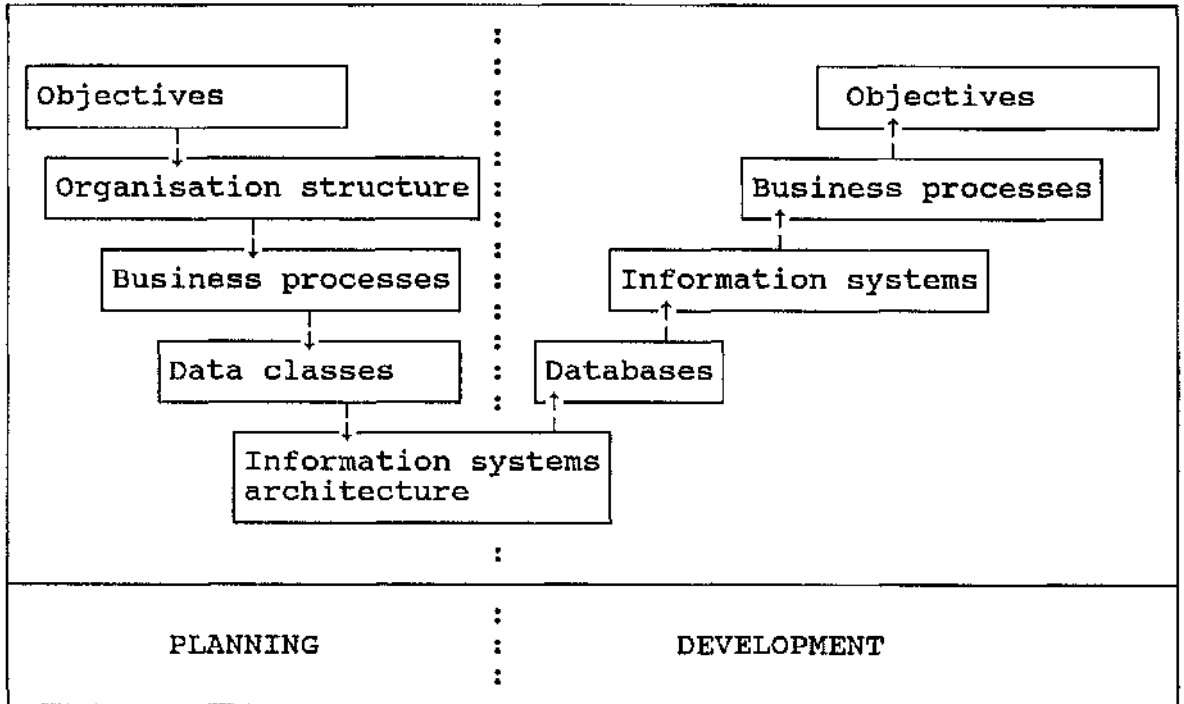
Figure 3.10   Planning and system development according to Martin (1985)

the jargon of IE. Because of the top down planning approach, the method supposes that a centralised management controls the IS investments and determines how systems are used. Martin supposes that organisations are uniform entities, in the sense that conflicting interests of various interest groups and conflicting aims of information systems are exceptional rather than usual. Especially the quotation of Martin (1985) at the beginning of this section, referring to the fact that systems are designed which support local needs, *and* similarly work together effectively *and* serve the top management information needs points in the direction of the assumption of the organisation as a uniform entity.

3.2.4 Stages Approach

In 1974, Nolan and Gibson published an article on managing data processing (Nolan and Gibson, 1974). In some companies they had discovered that expenditure and

managerial experiences were similar. A kind of an S-curve represented both expenditure and organisational learning. This path could be described by a four stage model (initiation, contagion, control, maturity). By this stages approach, the authors follow within a tradition of stages approaches of organisations, economies, mankind, men, societies etc. In 1979, Nolan elaborated his approach in the article *'Managing the Crises in Data Processing'* (Nolan 1979) with the identification of six stages (initiation, contagion, control, integration, data administration and maturity). Figure 3.11 illustrates the approach.

Growth → processes	Stage I	Stage II	Stage III	Stage IV	Stage V	Stage VI
Applications portfolio	Functional cost reduction applications	Proliferation	Upgrade documentation and restructuring of existing applications	Retrofitting existing applications using data base technology	Organisation Integration of applications	Application Integration 'mirroring' information flows
DP organisation	Specialization and technological learning	User oriented programmers	Middle management	Establish computer utility and account teams	Data administration	Data resource Management
DP planning and control	Lax	More lax	Formalized planning and control	Tailored planning and control systems	Shared data and common systems	Data resource strategic planning
User awareness	"Hands off"	Superficially enthusiastic	Arbitrarily held accountable	Accountability learning	Effectively accountable	Acceptance of joint user and data processing accountability
	Stage I INITIATION	Stage II CONTAGION	Stage III CONTROL	Stage IV INTEGRATION	Stage V DATA ADMINISTRATION	Stage VI MATURITY

Figure 3.11   Six stages of data processing growth (Nolan, 1979)

In these stages, a reciprocity between control and slack are the characteristics of the organisational learning. In the *control* environment, all financial and performance systems are used to ensure that data processing-activities are effective and efficient. This nurtures efficiency but constrains innovation. In the *slack* environment, though, sophisticated controls are notably absent. Instead, incentives to use data processing in an experimental manner are present. This nurtures innovation but allows inefficiencies.

Nolan advocates a balance between control and slack in order to create innovative and risky systems and to control the budget and prevent inefficient systems.

During the development of the approach (between 1973 and 1979), Nolan translated the descriptive model of 1973 and 1974 into a more prescriptive tool (Benbasat et al. 1984 and King and Kraemer, 1984). Between stage III and IV, Nolan claims a basic shift from *computer management* and towards a *management of data resources*. The advent of database management systems make this shift possible in technological terms. Basic features of Nolan's approach are the budget curve as a primary indicator of change and technology as a fundamental driver of change.

Discussion of Nolan's stages approach

An important strength of the approach of Nolan is the attention given to organisational learning. He strongly recognises the ability of organisations to learn from past experiences and develop from a history to a future with a certain progression by evolution. Nolan emphasises that an organisation that starts with the use of information systems cannot jump to an advanced company-wide database environment. Initial experiences are needed to advance step by step. Many managers recognise this approach in their own organisations. Information system professionals recognise the global technological progress in the stages approach and may perceive this as a legitimation of the acquisition of more advanced technology. The Nolan approach meets the demand for direction.

The approach can be generalised into the stages *initiation, diffusion, consolidation* and *integration* and is in that case a general curve of adaptation of new technology in organisations. Organisations gain a future perspective for their information technology policy. All these strengths explain the wide recognition and reputation of Nolan's stages approach. However, there are certain limitations.

The model assumes a beginning and an end. It starts with initiation and ends with maturity. Everyone can recognise the initiation but what is maturity? Organisational change and technological change make it impossible to determine this state of maturity. It may be wondered if we can pinpoint a certain state as mature. Maturity is not a static concept. Beside that, the stages concept implies that there are different levels in using information technology in qualitative terms. This hierarchy is doubtful when it is disconnected from business-needs, as Nolan does. The fact that an organisation can speed up its development through the stages and eventually pass over stages by recruiting experienced people and by conscious planning from the initiation-stage is not taken into consideration (Earl, 1989; Galliers and Sutherland, 1991).

The approach reflects the general development of information technology. This reflection may be correct, but is this necessarily the progression in every organisation? The evolution can be observed in a number of organisations, but does it necessarily prescribe the evolution and managerial choice in other organisations? Benbasat et al. (1984) collected empirical evidence that did not support Nolan's assumptions.

Nolan's model can be characterised as technology driven. An organisation grows towards a full and wide use of information technology. This neglects the vision that technology has to serve organisational objectives. When a certain technology (e.g. the database technology) is not perceived as useful for the realisation of organisational objectives, the technology has to be neglected. There is not a clear linkage between business strategy and information strategy and it neglects the fact that information technology provides many rather than few alternatives. The content of the applications portfolio is described as a normative set of applications in the different stages of growth in the life cycle of a company. This neglects matters such as competition and alternative business strategies. Differentiation in using information technology is not taken in consideration.

The approach advocates a relatively centralised use of information technology in the later stages. Integration (stage IV) and Data Administration (stage V) are clear examples. By doing so, it does not take the kind of organisation into consideration. Centralisation might be appropriate for one organisational context but inappropriate for another. The approach can be characterised as mechanistic/organic and uniperspectival. One mechanistic path of growth is projected and only the perspective of organisational learning by using available technology is taken into consideration.

3.2.5 Value Chain Analysis

This approach (described by Porter and Millar, 1985) reveals the potentially critical role that information systems can play in leading an organisation's strategic efforts. The value chain views the organisation as a series of input, transformation and output stages, where at each stage it may be possible to enhance an organisation's competitive position. By identifying information intensive locations on the value chain, firms can enhance their competitive position through the use of information systems. Porter's value chain analysis is the first major strategy research that explicitly views information systems as a strategically vital resource (Boynton and Zmud, 1987). Based on their work, other authors elaborated the idea that information systems might be a means for the realisation of a strategy, and not only a support tool for operationalisation. Earl (1989) calls these approaches *awareness* and *opportunity* frameworks for gaining strategic advantage through IT. Porter and Millar's awareness framework helps a company to categorise its products and its value chain as having a low or a high information intensity. This is illustrated in figure 3.12.

		Information content of the product	
		LOW	HIGH
Information intensity of the value chain	HIGH	Oil refining	Newspapers Banking Airlines
	LOW	Cement	

Figure 3.12   Porter and Millar's information intensity matrix (Earl, 1989, p. 45)

The dimension *information intensity of the value chain* refers to the division of the distinct activities of a firm to do business. These are called *value activities*. A value chain is a system of value activities which are connected by linkages, which is called the value system (Porter and Millar, 1985). An example of such a value chain is shown in figure 3.13.

Such a figure can be used to consider opportunities for using IT in the following ways (Earl, 1989, Porter and Millar, 1985; Pruijm, 1990; Ward et al., 1990): 1) to automate or improve the physical tasks in each activity, e.g. by robotisation, or Computer Aided Manufacturing, 2) to connect or control the activities across linkages, 3) to perform, support or manage value activities, 4) to optimise or to coordinate activities across linkages, and 5) to connect the value system with the system of suppliers or customers, as well as to connect various internal value systems. This last suggestion is based on the idea that the Value Chain Analysis has to be carried out at business unit level. It may be possible that a firm would like to have a connection among various business units (Ward, 1990).

SUPPORT ACTIVITIES					
Administration and Infrastructure			general management of the enterprise as a business entity		
Human resource management			recruiting, training, developing and rewarding personnel		
Product/technology development			developing the technology of the product and processes and business management		
Procurement			acquiring the required inputs to the value adding process		
Inbound logistics receiving, storing and disseminating inputs to the product or service	Operations transforming inputs to outputs	Outbound logistics distributing the products or services to customers	Sales and marketing providing ways in which the customer can purchase the product and inducing them to do so	Services enhancing or maintaining the value of the product/ service once purchased	
PRIMARY ACTIVITIES					

Value added
- cost
= margin

Figure 3.13   *An example of a firm's value chain (Porter and Millar, 1985)*

Discussion of the Value Chain Analysis Approach

The value chain analysis as well as the information intensity matrix has important qualities. This approach is clearly directed to managers and it considers general managers as being mainly responsible for the applications portfolio. It uses a managerial terminology, rather than a technical one. This approach emphasises clearly that information technology applications may have a strategic impact on a firm's competitive position and it helps managers to find new areas to utilise information technology. In this sense, it is much more an impact than an alignment approach (Vitale et al., 1986). It may be expected that this model -as well as other comparable models which emphasise the strategic dimension of the use of IT (see e.g. Earl, 1989; Pruijm, 1990; Ward et al. 1990)- would help to get a high level of involvement from

general managers as well as a good fit with the organisation's strategy as a whole.

The method has limitations. In the strategic sense, it considers the current way of adding value, but it does not explicitly look critically at the possibilities of re-designing this value chain as a whole, as Hammer (1990) suggests. It interprets the value chain as a set of sequential steps which might be optimised by IT. Another way of looking to the value chain should be to reconsider the necessity of that sequence as Teng et al. (1994) suggest. Furthermore, while the strong points are strategic and market orientedness, the approach has weak points in the field of political analysis, learning analysis and cultural analysis. Another limitation is its lack of rigour. This approach offers a means to increase consciousness to apply information systems, but it does not look closely at architectural and infrastructural issues. A method such as BSP (section 3.2.1) or IE (section 3.2.3) might be needed to operationalise certain desired directions. This approach is more directed to a global direction (an awareness framework, (Earl, 1988)) than to a concrete development plan. The method and the examples of Porter appear to be directed to certain kinds of organisations such as manufacturing and large service organisations such as banking and insurance.

3.2.6 Differences and similarities of these approaches

The IM-approaches, as discussed in sections 3.2.1 - 3.2.5 can be integrated into a single comparative framework, shown in figure 3.14. The criteria are partially based on Boynton and Zmud (1987), who compare various approaches according to the criteria: politics, market, strategy, external markets, technology, learning, culture, infrastructure and risk.

All the approaches discussed cover the need for top management commitment; this is generally viewed as essential for a successful IM policy (Bakos and Treacy, 1986; Brancheau and Wetherbe, 1987; Lederer and Sethi, 1988). The more managerial an

approach is (such as Porter and CSF), the more successful the approach may be in securing top management commitment. The downside of such an approach is often the lack of attention to architectural aspects; the managerial approaches are often more *development plans* than *blueprints*. Success in involving top management also implies a high chance for a strong relation with the company policy as a whole. The question whether an alignment approach or an impact approach is most appropriate will depend on the specific situation of a company. In competitive environments with high information intensities of processes and products, an impact approach will often be more successful than an alignment approach. Alignment approaches are more appropriate in stable environments.

Nearly all the approaches discussed adopt a top down planning sequence and can therefore be called centralistic, except the Porter approach, which aims to utilise IT at business unit level, which is not necessarily the top level of an organisation. Attention to organisational politics and the feasibility of certain systems from that point of view (Boonstra, 1991a, 1991b; Keen, 1981; Markus, 1983a) is not treated in any of the discussed approaches. Learning and culture characteristics are also neglected. Each of the approaches discussed supposes that the organisation is a homogeneous unity with a consistent set of goals, which can be reached through business activities. These activities might be supported by systems which have to be planned. One gets the impression (by studying the methods and by applying some of them in real life-situations) that most methods for information policy and information planning are designed for large companies with a functional organisational structure and with experience and capacity to design and build information systems which are supported by a company-wide database.

Characteristic	BSP	CSF	IE	STAGES	VALUE CHAIN
Involvement top management	+	++	++	+	++
Relationship with company policy	+	++	+	-	++
Blueprint (BP) - development plan (DP)	BP	DP	BP	DP	DP
Impact (I) - alignment (A) (Vitale, 1986)	A	I	A/I	A	I
Attention for IT-infrastructure	yes	no	yes	±	no
Attention for competitive developments	-	yes	yes	no	yes
Attention for organisational learning	no	no	no	yes	no
Centralistic (C) - decentralistic (D)	C++	C+	C++	C	CD
Political analysis	no	no	no	no	no
Cultural analysis	no	no	no	no	no
Involvement of other users than top managmnt	±	±	±	±	±
Kind of organisation taken into consideration	no	no	no	no	no
Organisation as a uniform versus a multiform entity	unif	unif	unif	unif	unif

Figure 3.14 Five approaches compared

Certain authors claim that other approaches are needed in order to support smaller organisations, organisations with less experience in applying IT and organisations lacking the machine organisation characteristics in order to provide guidelines for using information technology in such different organisations. For example Bakos and Treacy (1986):

> 'Furthermore, each is based on an implicit idiosyncratic theory of organisations that is not grounded in the main body of organisational design literature. Although some of these theories are inventive, they neither contribute to, nor are leveraged by the accumulated knowledge of organisational theory. They are only private theories of organisational design, embedded with traditional MIS techniques' 'As the field matures, the primary focus of academic research should move to a deeper level of analysis, characterized by specific, explanatory models connected to broader general theories. Approaches drawing on appropriate reference disciplines can avoid idiosyncratic, private theories of the

strategic use of information systems' (p. 117).

In other words, Bakos and Treacy argue that many of these traditional approaches are relatively isolated from the mainstream of organisational thinking, and are often based on technological thinking styles, rather than on the mainstream of organisational thinking. Lederer and Sethi (1988) are close to this criticism when they argue:

> 'Perhaps, these methodologies require too much detail in their business analysis and database design. It may be too much to expect that a committee charged with detailed business analysis and database design could generate strategic visions about systems for creating a competitive advantage' 'Perhaps researchers should search for completely new and innovative alternatives for performing SISP' (p. 459; SISP = Strategic Information Systems Planning).

Boynton and Zmud(1987) make the organisational model behind these approaches more explicit and look for more realistic ways of decision making with respect to information systems. They argue:

> 'Many of the assumptions and premises that underlie the current planning literature reflect a rational model of organisational decision processes. Such a perspective provides valuable insights into critical IT planning issues. Other decision process models, however, provide alternative, quite robust descriptions of the decision processes likely to arise within the information economy' (p. 68)

and:

> 'The literature has invariably viewed IT planning as being driven by the IS function. Such a characterization does not depict planning activities in an information economy. More importantly, such a perspective does not indicate how IT-strategies and action plans will be shaped in this information economy' (p. 67).

Earl (1993) emphasises the importance of attention for the process of planning and implementation rather than overemphasising one particular method. He argues:

> 'no single factor is likely to lead to universal success in SISP. Instead, successful SISP is more probable when organizations realize that method, process, and implementation are all necessary issue sets to be managed' (p. 5).

and:

> 'The organizational approach to SISP suggested by this study might also be seen as an alternative school of thought. This particular approach, therefore, should be investigated further to understand it in more detail, to assess its effectiveness more rigorously, and to discover how to make it work' (p. 17).

This critique can be summarised as follows.

1 Many methods still have a technical focus and are derived from a system developer's viewpoint and are not grounded in the body of organisational literature.

2 An underlying assumption of the approaches is a model of rational decision making from the top of the organisation.

3 Many methods take one kind of organisation into consideration; often a machine bureaucratic manufacturing organisation.

4 Many methods are looking at organisations from a narrow (usually mechanistic, sometimes organic) view; more perspectives (power, culture etc.) are not considered; in consequence of this, they are oversimplified.

5 Many methods cover only information system approaches involving large integrated data processing systems; communication systems, interorganisational systems, isolated process-support systems, software packages and executive information systems are not taken into consideration (see chapter 1).

6 Many methods do not pay much attention to organisational factors, such as the process of planning and the implementation of a plan within a certain cultural and organisational context.

7 Many approaches are idiosyncratic and private; they are not embedded in the theories of organisational design and organisational behaviour.

Researchers and practitioners are challenged by this critique to deliver building blocks to methods which can guide managers in formulating an information policy which is based on organisational reality and is embedded in organisational theory.

New information management approaches should be needed to cope successfully with the new era referred to in chapter 1. Sensitivity to the specific kind of organisation and a wider range of organisational perspectives should improve these models. Management research should not leave this field to the computer-specialists. The models of the engineers will often be mechanistic and technology oriented. New approaches should use the terminology of general managers and other non-IS

employees. They have to deliver guidance for information management; information technologists should be able to derive technical specifications from the output of these methods to maintain existing systems and develop new ones. This study attempts to relate the specific characteristics of organisations and the information systems used. Such an analysis provides organisations with information management guidelines specifically developed for particular types of organisation.

3.3   DISCUSSION OF THESE APPROACHES WITH MODEL OF BURELL AND MORGAN AS A FRAMEWORK

In order to obtain a deeper insight in the approaches discussed, it may be helpful to apply the categorisation developed by Burell and Morgan (1979), and later described and further explained by Morgan (1980). Kendall and Kendall (1993) and Hirschheim and Klein (1989) have applied the approach of Burell and Morgan in the field of systems development.

Burell and Morgan (1979) argue that social theory in general, and organisational theory in particular, can be analysed in terms of four broad world views (paradigms), which can be reflected in different sets of metatheoretical assumptions. These world views are related to the *nature of science*, the subjective - objective dimension, and the *nature of society*, the dimension of order - conflict. Figure 3.15 shows these dimensions.
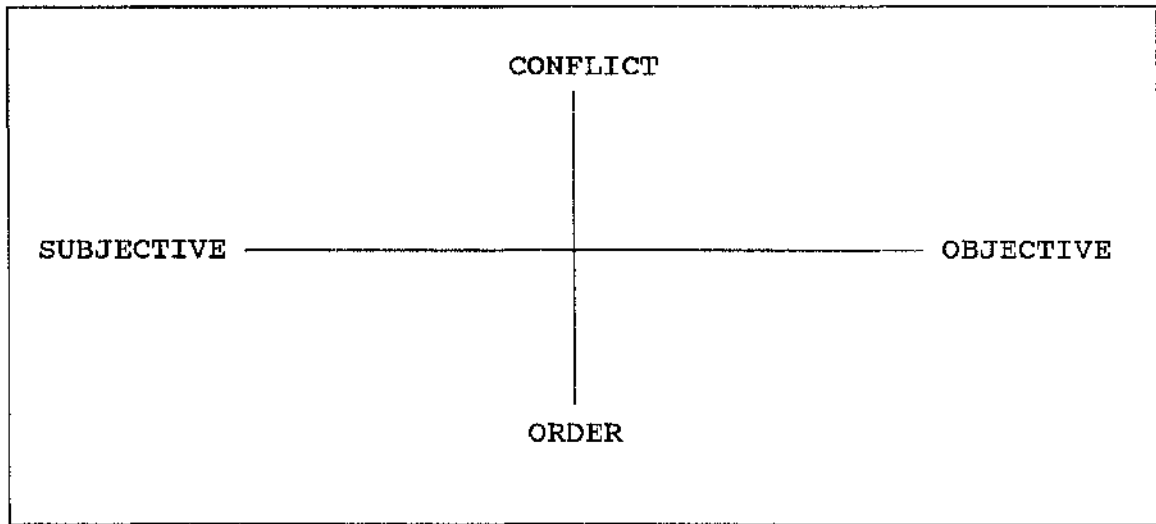
Figure 3.15   Contrasting paradigms in social theory (Burell and Morgan, 1979)

The dimension *order* versus *conflict* assesses different models according to certain assumptions. The 'order' assumptions are: 1) each organisation is a relatively persistent, stable structure, 2) each organisation is a well integrated structure of elements, 3) every element in an organisation has a function and renders a contribution to its maintenance as a system and 4) every organisation is a social structure which is based on harmony and consensus. In contrast to this, the 'conflict' assumptions are: 1) each organisation is at every point subject to processes of change, 2) every organisation displays at every point dissensus and conflict, 3) every element renders a contribution to its integration and change and 4) every organisation is based on coercion of some of its members by others. These opposing adjectives can be brought together in a table, as shown in figure 3.16.

The order view emphasises:	The conflict view emphasises:
Stability	Change
Integration	Structural conflict
Function co-ordination	Disintegration
Consensus	Dissensus, coercion
Cohesion	Contradiction

Figure 3.16   Two theories of organisations: order and conflict
            (based on Burrell and Morgan, 1979)

The essence of the objectivist position

> 'is to apply models and methods derived from natural sciences to the study of human affairs. The objectivist treats the social world as if it were the natural world' (ibid., p. 7).

In contrast, the subjectivist position denies the appropriateness of natural science methods for studying the social world and seeks to understand the basis of human life by delving into the depths of subjective experience of individuals. As Burell and Morgan put it:

> 'The principal concern is with an understanding of the way in which the individual creates, modifies, and interprets the world in which he or she finds himself [or herself]' (ibid., p. 3).

This contradiction will be discussed further in chapter 4, which examines the methodological fundaments of this study.

Referring to section 3.3, the information management approaches discussed should be categorised in the right bottom box of the categorisation of Burell and Morgan. All these approaches suppose one consistent set of organisational goals and natural consensus with respect to these goals among the organisational participants. This is shown in figure 3.17.
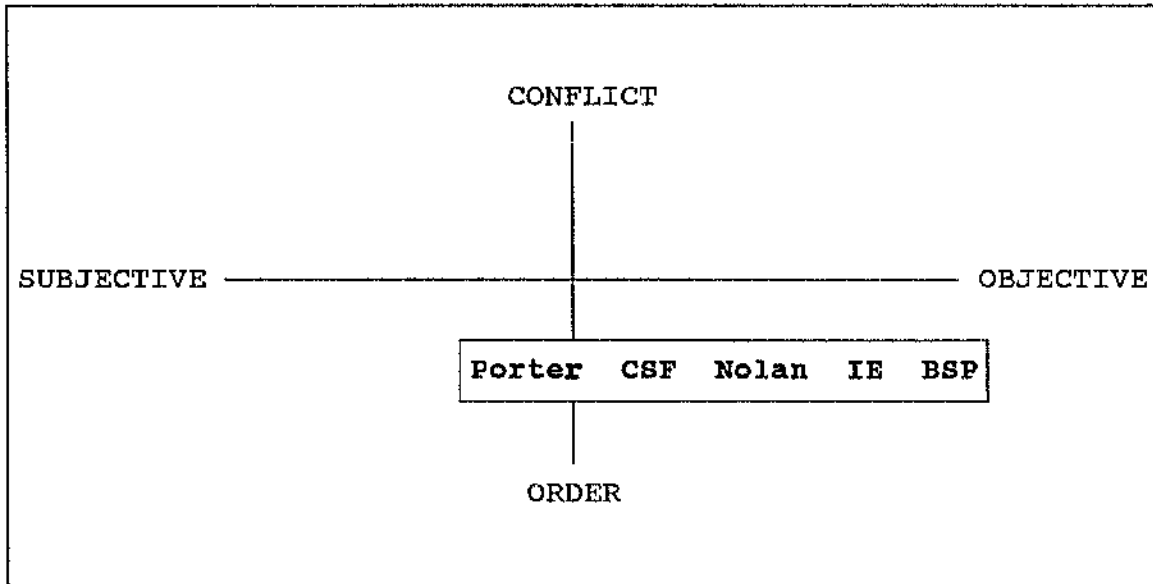
Figure 3.17   *Paradigms and the discussed approaches*

The approaches which are put more to the subjective dimension adopt a more subjective strategic point of view with high impact characteristics. Methods such as BSP are designed to be filled in in an exact and consistent way.

Chapter 2 discussed the professional organisation as a distinctive kind of organisation. As explained in chapter 2, the professional organisation can be characterised to a certain degree by a contradiction of interests and orientations between management and professionals (explained in e.g. section 2.2.2, 2.2.3 and 2.3). The power is also dispersed and divided among the various professional groups and the management. In this light, it is doubtful whether the assumptions of the information management approaches which are discussed in sections 3.2.1 - 3.2.5 are complete or fit well with the information management issues in professional organisations. This supports the argument that the conflict assumptions of organisations are more suitable to professional organisations than the order approach. This supposition is represented in figure 3.18.
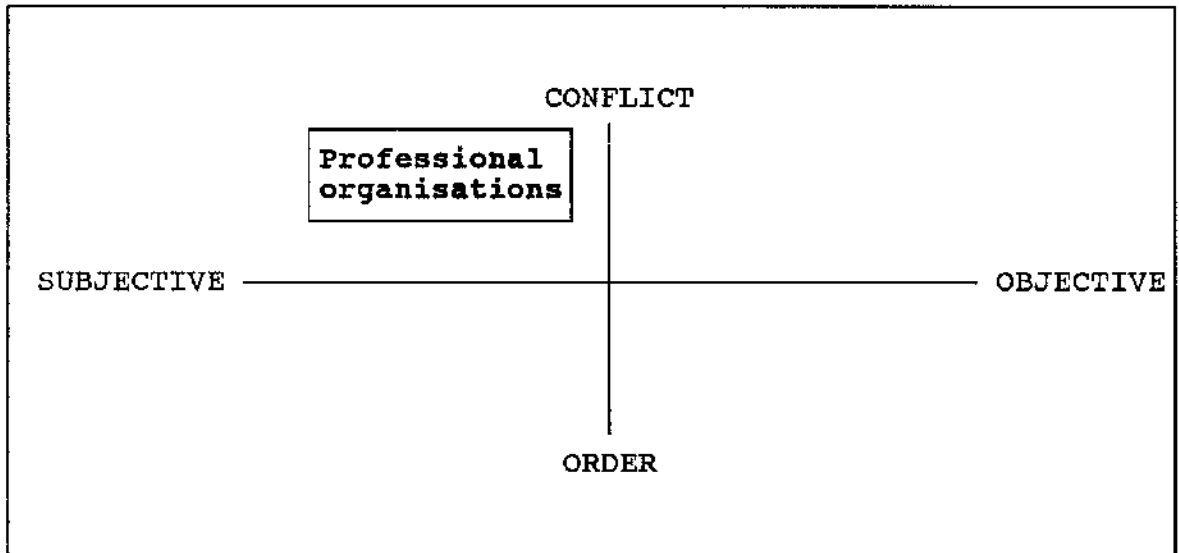
Figure 3.18   Paradigms behind the conception of the professional organisation

3.4   ALTERNATIVE APPROACHES

Some authors have developed information management models which cover other areas in Burrell and Morgans categorisation of figure 3.15 and might be useful for the diagnosis of professional organisations: approaches which will be discussed in this section are the states of computing management model of Kraemer et al. (1989), the theories of resistance of Markus (1983a), the organisational validity concept of Markus and Robey (1983b) and the failure analysis of Keen (1981).

3.4.1   Kraemer's states of computing management model

Kraemer, King, Dunkle and Lane (1989) developed an interest group approach to computing, based on extensive longitudinal studies in municipalities in the USA.
Their theory begins by defining two attributes of management. The first is the enablement for action (characterised by the question *Who rules computing?*) and the

second is the predisposition to act in specific ways (characterised by the question *Whose interests are served by computing?*). Enablement is measured by the hierarchical level of the organisation in which major control over computing-related decisions resides. There are in their eyes three possible loci of control: 1) the Information Systems (IS) management, 2) the departmental management and 3) top management.

Predisposition to act is measured by the orientation toward the appropriate application of computing held by the dominant authority over computing-related decisions. Kraemer et al. distinguish three basic orientations toward the appropriate application of computing. These orientations, which also serve different interests are:

1) to enhance overall organisational technical capability,

> 'Technical interests (interests of the IS management) are oriented towards developing the technical merits of the computing package, especially in terms of advanced software, hardware and integration' (ibid., 117-118).

2) to support routine operations

> 'Operational interests (interests of the operational departments) are concerned with applying computing resources in a manner that maximizes their usefulness to the conduct of departmental functions, such as service delivery, customer inquiry, field support, record keeping etc.' (ibid., 120-121).

3) to facilitate planning and management by organisational leadership.

> 'Managerial interests (interests of the top management) are oriented towards using computing to further the goals of organisation-wide management. These goals include enhancing the organisation's strategic advantage and increasing internal efficiency by maximising revenues, controlling expenditures, monitoring departmental performance, and maintaining control over departmental functions' (ibid., p. 121-123).

When locus of control and interests served are arrayed as two axes of a matrix, nine possible combinations of the attributes result. Each combination represents a management state with identifiable characteristics. This leads to the model as shown in figure 3.19.

Locus of Managerial Control

		IS Management	Departmental Management	Top Management
	Technical	**SKILL**	Service/Skill Mix	Strategic/Skill Mix
Types of Interest Served	Operational	Skill/Service Mix	**SERVICE**	Strategic/Service Mix
	Managerial	Skill/Strategic Mix	Service/Strategic Mix	**STRATEGIC**

Figure 3.19   Various states of computer management (Kraemer et al., 1989, p. 30)

These nine states contain three combinations where the level of managerial control and the orientation toward use are congruent and coherent; these are *the Skill state, the Service state* and *the Strategic state.* The word *state* is not meant as a static situation which continues for a long time, but as the situation in a certain period. Kraemer et al. discovered that these states may change after the replacement of influential people, after a power struggle or as the result of a negotiation process. Besides, they discovered that the Skill-state and the Strategic state are much more stable and protected by influential interest groups (respectively the IS-management and the top management) than the Service state and the mixed forms. The three congruent states can be described as follows:

Skill state

In the Skill state the primary objective of computing activity is to maintain a high degree of technical sophistication, with the immediate utility of applications being a

secondary concern. The IS management controls computerisation and applies computing resources to the enhancement of technical quality in the organisations. Acquisition and allocation systems are directed by and for IS management. The IS manager flourishes, committed to implementing a particular vision of computerisation. There is a monopoly of technical expertise. The elite controls computing growth and change to suit its technical interests and ambitions. These ambitions are determined by needs and desires of an expansionistic IS management.

Service state

The intersection of control by department managers and application to enhance organisational operation is called the Service state. Here, the primary objective is to support a broad user base, with all other organisational concerns as secondary. The computing acquisition and the allocation of systems is directed by and for departmental management. Development of functional applications has top-priority. No person or single interest dominates computing decision making. Decisions are made through the pluralistic establishment of compromises and coalitions among the varied interests competing for computing resources. Computing package growth accelerates as computerisation expands in and across departments. Growth represents the variety of operational interests being served. Hardware acquisitions encompass a broad array of capabilities, based on the myriad needs of users. The service state occurs when the user community exerts dominant control over computerisation and is most directly served by the activity. Top management is a bystander and its involvement is just like any other. It seldom intervenes. IS-management is in business in meeting the requests of users. IS staff generally work to find the best solution for users. The equilibrium between stability and change, and between various users' needs and the desires of IS management, is maintained by a sensitive market-like mechanism in which users offer resources to the IS organisation in exchange for assistance.

Strategic state

The intersection of top management control with application to planning and organisational management is called the Strategic state. The primary objective of this state might encompass desires for technical sophistication and support of the user base, but it centers on supporting the particular objectives of top management at any given time. Top management controls computerisation and the broad interests of the top management are served. The computing acquisition and allocation system is directed by and for the top management. The general goals of the organisation and the specific goals of the top management receive top priority. This mode is often characterised as the ideal mode of decision making behaviour in the computing management literature.

The remaining cells of figure 3.19 constitute mixtures of these three congruent states and are called Mix states. Figure 3.20 and 3.21 respectively show the characteristics and the costs and benefits of the congruent states in a diagram. These tables will be used to analyse the case studies and to apply the approach of Kraemer on the hospitals.

	Skill	**Service**	**Strategic**
Locus of Control	IS management	Departmental management	Top management
Interest Served	Technical	Operational	Managerial
Policy Mode	Elitism	Pluralism	Rationalism
Difussion Trajectory	Advanced systems	Multiple levels	Integrated systems
Computer Applications	Intensive in narrow range, scattered in broad range	Broad range, extensive distributed turn-key applications	Narrow range intensive, integrated
Computer Hardware	Centralized or distributed network; leading edge	Centralized or decentralized. Mid-tech variety	Centralized; mainstream systems

Figure 3.20   Characteristics of the Skill, Service, and Strategic States (Kraemer et al., 1989, p. 117)

Category	Service	Skill	Strategic
TOP MANAGEMENT			
Manager's time and attention spent on IT matters	ME	LO	HI
Dollar costs of IS	HI	ME	LO
Problems with computing	ME/LO	ME/LO/HI	LO
Quality of investment decisions to the organization	LO	ME	very HI
IS MANAGEMENT			
IS manager's time devoted to users	HI	LO	ME
IS manager's time devoted to technical matters	LO	HI	ME
Problems with users	LO	HI	ME
Technical quality of computing investments	LO	HI	ME
DEPARTMENTAL MANAGEMENT			
Dept manager's time devoted to computing	ME	LO	HI
$ costs	HI	HI/ME	ME
Problems with computing	LO	HI	ME
Quality of investment decisions	HI	LO	ME
End user support from IS	HI	LO	ME
Departmental influence over IS decisions	HI	LO	ME
Quality of systems and applications	HI	HI	ME
Leverage for future IS resource and staff	HI	LO	LO

Figure 3.21 Costs and benefits to top managers, IS managers and departmental managers of the different states (Kraemer et al., 1989, p. 269, 272, 275)

3.4.2 Other approaches

Markus

Markus (1983a, 1983b, 1984) emphasises that the specific characteristics of a particular organisation (in this study: the professional organisation) are relevant to the use of information systems. In her article *'Power, Politics, and MIS Implementation'* (1983a), Markus shows that the familiar reasons for resistance are lack of top management support, lack of user involvement and lack of user friendliness and technical quality. These reasons can be called *people determined* or *system determined*. The managers, users or system developers failed to act in an optimal way and/or the technical qualities of the system were not adequate. Markus argues that these familiar reasons do not explain many implementation failures, because they assume organisational rationality and unity.

She introduces the *interaction theory* to clarify her view that the interaction between system features and organisations often explains resistance. This explanation supposes that there are different groups and coalitions in organisations with partially conflicting interests. Systems may affect the power distribution among these groups and coalitions and will consequently cause resistance from losers and support from winners. Figure 3.22 shows this concept.

The 'organisational validity'-concept

Another contribution of Markus (together with Robey) to this field is the concept of 'organisational validity'. The core idea of this organisational validity concept is that resistance arises because a certain system does not fit the individuals' and groups' work patterns, or the structure of the organisation (e.g. the reporting relationships between individuals, groups and departments) (Hirschheim and Newman, 1988). According to the analysis of Markus and Robey (1983b), the organisational validity of a certain system refers to its contribution to the organisational effectiveness, the

political acceptance of a system and the system match with users' psychological characteristics.

	People Determined	System Determined	Interaction Theory
Cause of resistance	Factors internal to people and groups	System factors such as technical excellence and ergonomics	Interaction of systems and contex of use
	Cognitive style Personality traits Human nature	Lack of user friendliness Poor human factors Inadequate technical design or implementation	Sociotechnical variant: Interacti of system with division of labor Political variant: Interaction of system with distribution of intra-organizational power
Assumptions about purposes of information systems	Purposes of systems are consistent with Rational Theory of Management, can be excluded for further consideration	Purposes of systems are consistent with Rational Theory of Management can be excluded from further consideration	Sociotechnical variant: Systems m have the purpose to change organi-zational culture, not just workfl Political variant: Systems may be intended to change the balance of power
Assumptions about organisations	Organizational goals shared by all participants	Organizational goals shared by all participants	Sociotechnical variant: Goals conditioned by history Political variant: Goals differ b organizational location; conflict is endemic
Assumptions about resistance	Resistance is attribute of the intended system user; undesirable behavior	Resistance is attribute of the intended system user; undesirable behavior	Resistance is a product of the setting, users and designers; neither desirable nor undesirable

Figure 3.22   *Theories of resistance: underlying assumptions (Markus, 1983a)*

Markus and Robey perceive organisational validity as a descriptive and relative concept rather than a normative and absolute one (ibid.). The authors argue that organisational validity is not a property of a certain system or of the organisation in which it is used, but rather of the degree of fit or match between them. A certain system may be valid in one context and invalid in another. Markus and Robey distinguish four types of organisational validity: 1) *User - System Fit*: validity is achieved if the system fits the user's psychological characteristics, 2) *Organisational Structure - System Fit*: the match between the structural characteristics of an organisation and different system design attributes, 3) *Power Distribution - System Fit*: this fit is achieved if the system does not change the power distribution through a

redistribution of data and 4) *Environment - System Fit*: this fit refers to the improvement of the relations with the environment (e.g. customers and suppliers) through systems.

Markus and Robey argue that these 'fits' refer to various interests which are affected by the implementation of systems [1]. The argument is that only a serious attempt to integrate these interests through negotiations may lead to effective implementation and the use of a valid system. Figure 3.23 illustrates that argument.
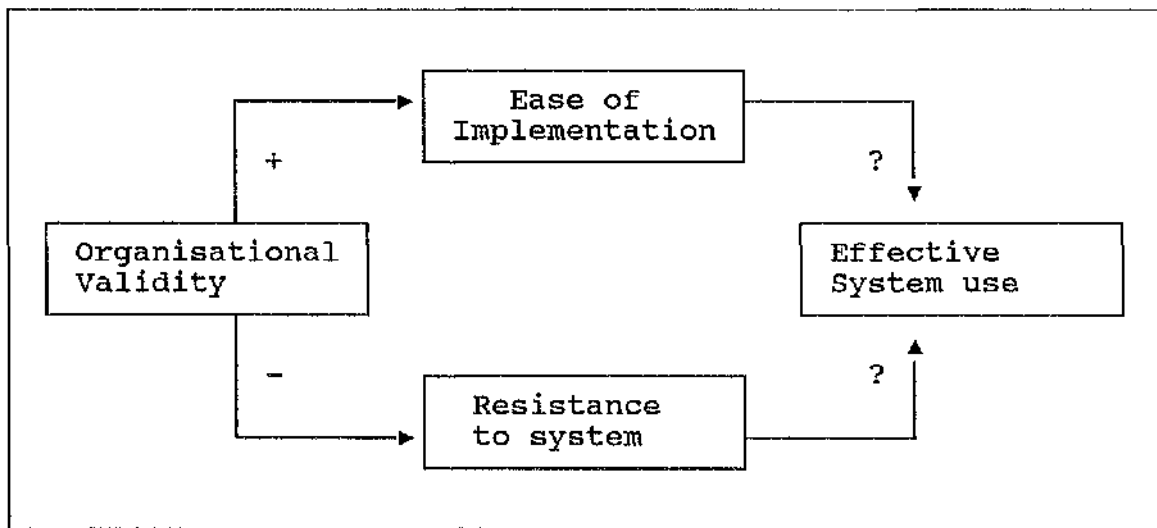
| *Figure 3.23* | *Possible relations between organisational validity and (in)effective system use (Markus and Robey, 1983b, p. 221)* |

Keen

Keen (1981) perceives the introduction of information systems as organisational change in his article *'Information Systems and Organizational Change'*. Keen wonders

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1

Noble and Newman (1993) give in their article *'Integrated System, Autonomous Departments: Organizational Invalidity and System Change in a University'* an interesting example of a misfit between the integrative characteristics of a Student Information Management System and the autonomous features of the departments in which that system had to be implemented. Noble and Newman show how organisational and structural characteristics impact the development process and how the system was altered in a way that was more consistent with the existing organisational arrangements.

why many implementation projects of information systems are technical successes but organisational failures. He believes that there are three main reasons for organisational failure of information system.

1 The contrast between human ways of information processing (simple, experimental, nonanalytic) and the information processing style of formalised information systems. Keen thinks that this contrast explains why many people perceive information systems as threatening and unnecessary.

2 New information systems change the equilibrium between tasks, technology, people and structure (the Leavitt diamond) (Leavitt, 1964) and tend to improve managerial control. (Keen refers to many authors who argue that such radical changes can only take place successfully under unusual circumstances).

3 Keen argues that information is a central political resource. Many agents and units in organisations get their influence and autonomy from their control over information. They will not readily give such control up. Keen argues that many new information systems represent a direct threat and agents respond accordingly.

Keen advises project managers to rely on incremental rather than radical change, to choose small scale projects and to facilitate this on a face to face basis.

3.5   PROFESSIONAL ORGANISATIONS AND INFORMATION MANAGEMENT APPROACHES

Chapter 2 discussed the phenomena of professionals and professional organisations. This discussion showed that such organisations can be characterised by:

1) a high level of power of the professionals, through their professional associations, their expert power and their profession orientedness and 2) the striving of professionals towards *professional autonomy*, which might become a contrast with the possible striving of the management towards integration, macro effectiveness, efficiency and coordination. This contradiction is explained as the 'Professional-Management conflict' (section 2.2.3).

This characterisation through the *political metaphor* (Morgan, 1986) explains the assumed appropriateness of the alternative approaches of people such as Kraemer, Markus, Keen and others who perceive computerisation as a political process rather than as a rational top down process. The image of the professional organisation as a multiform entity with various interest groups (among which can be mentioned: management, professionals and support staff) seems to be more appropriate than the image of such organisations as uniform and homogeneous entities. The models and approaches which are discussed in section 3.4 adopt the view of the organisation as a multiform rather than as a uniform entity and accordingly computing as a multiform phenomenon: we can call this *multiform computing.* Figure 3.24 places this in the model of Burell and Morgan.

```
                                    CONFLICT
         Kraemer, Markus, Keen      |
                (3.4)               |
                                    |
                                    |
SUBJECTIVE ─────────────────────────┼─────────────────── OBJECTIVE
                                    |
                           Porter  CSF  Nolan  IE  BSP
                            |         (3.2)
                            |
                         ORDER
```
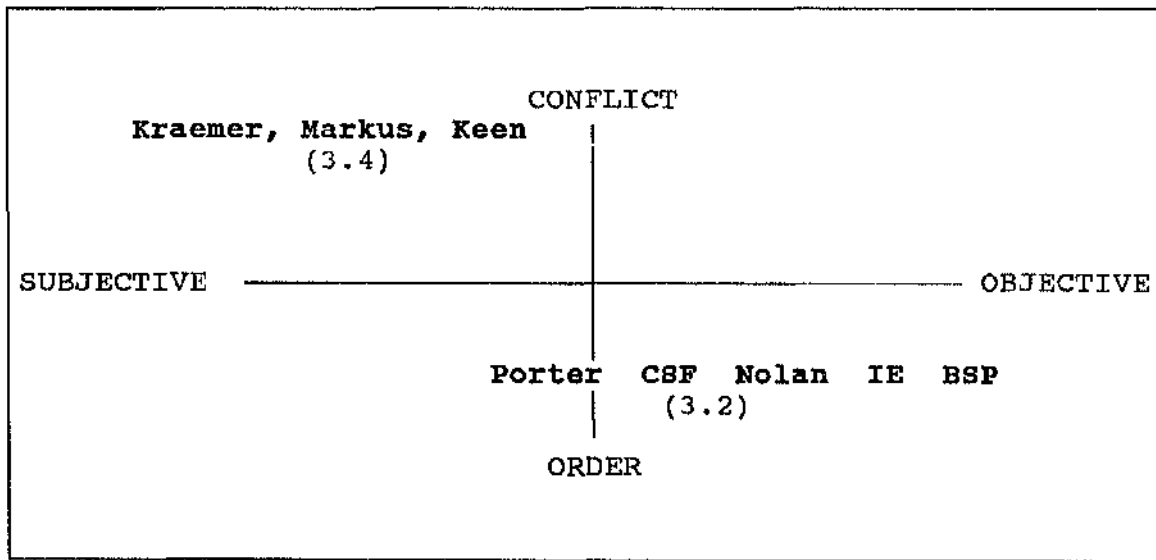
Figure 3.24   *Paradigms of the traditional and the alternative approaches*

Figure 3.24 illustrates the difference in approach between the common approaches which adapt an 'order - objective' perspective on systems policy, systems planning and systems development and the alternative approaches which view organisational reality as being subjective and influenced by internal conflicts of interests. Some of these alternative approaches, especially the model of Kraemer (described in subsection

3.4.1) and the Professional - Heteronomy model (as explained in subsection 2.4.4), but also the concepts of Markus and Robey as explained in subsection 3.4.2 will be used to analyse the case studies of chapter 6 and 7.

CHAPTER 4

METHODOLOGICAL CONSIDERATIONS

4.1   INTRODUCTION

This chapter will deal with methodological questions related to this study. Section 4.2 will explain why this study uses the case study method to deal with the central question. Besides, this section gives some insight in the phases of this study, the attitude towards data and some other questions related to this study. Section 4.3 discusses some more specific issues of this research project, such as site selection, access to case sites, sources of data and questions of validity, reliability and generalisability. The chapter concludes with a categorisation of this study within the framework of Burell and Morgan (see also section 3.3).

4.2   GENERAL METHODOGICAL ASPECTS

Many writers (e.g. Easterby-Smith et al., 1991; Ghauri et al., 1995; Lammers, 1983; Morgan, 1980 and Morgan and Smircich, 1980) discuss the research strategy question in the context of a certain contradiction between positivists or objectivists on one side and phenomenologists or subjectivists on the other. This phenomenology is a reaction to the application of positivism to the social sciences and asserts that the world is a social construction rather than an objective and concrete structure.

In spite of that discussion, one can argue that the choice of an appropriate research strategy depends on the questions which the study attempts to answer. Some research questions require a quantitative and positivistic approach, while other questions cannot be worked out and expressed in full operational and quantitative terms and demand a more phenomenological approach. Especially when processes are studied in complex settings, where opinions of people are important and when few previous

studies have been carried out, a more open and exploratory approach is most appropriate. In these situations, hypotheses have to be generated rather than tested and verified. The researcher is expected to have a listening attitude; merely checking hypotheses through extensive questionnaires will result in a poor and inappropriate image of the real situation. These were the main reasons to use such a research approach for this study. This will be explained further in subsection 4.2.1.

4.2.1 The choice of a method

Yin (1989) developed a framework to help researchers in the social sciences to choose a proper research strategy. This framework is summarised in figure 4.1.

Strategy	Form of research question	Requires control over behavioral events?	Focuses on contemporary events?
Experiment	how, why	yes	yes
Survey	who, what *, where, how many how much	no	yes
Archival analysis	who, what *, where, how many how much	no	yes/no
History	how, why	no	no
Case study	how, why	no	yes
* 'What' questions, when asked as part of an exploratory study, pertain to all five strategies			

Figure 4.1   Relevant situations for different research strategies (Yin, 1989, p. 17)

Applying this framework, the empirical part of this study can be characterised as a 'how and why' question. The central problem can be reformulated as *'How is the*

information systems management practice carried out in professional organisations and why is it carried out in that way? In the initial stages, the objectives of the study are exploratory and descriptive (how). Later, in the concluding sections of the case-descriptions and in the concluding chapter, the case-material will be explained (why) and conclusions will be drawn. In order to reveal the way information management is carried out in practice in professional organisations, the situation has to be observed in a real life setting. It is not in the interest of dealing properly with the research question to influence or to direct the behaviour of the subjects being studied, while the study is focused on contemporary events. In view of this, case study research seems to be the most appropriate way to carry out this research according to Yin's meta-approach. This agrees with the conclusion of Benbasat et al. (1987) who argue in their article *'The Case Strategy in Studies of Information Systems'* that case research is particularly appropriate for certain types of problems:

> 'those in which research and theory are at their early, formative stages, and 'sticky', practice based problems where the experiences of the actors are important and the context of the action is critical' (p. 369).

This quotation supports and strengthens the choice for a case research strategy for this study. The research and the theory in this field are indeed in an early stage and the actors as well as the context are of critical importance. Benbasat et al. (ibid.) mention three reasons why case study research is especially viable in MIS-studies:

> 'First, the researcher can study information systems in a natural setting, learn about the state of the art, and generate theories from practice. Second, the case method allows the researcher to answer 'how' and 'why' questions, that is, to understand the nature and complexity of the processes taking place' 'Third, a case approach is an appropriate way to research an area in which few previous studies have been carried out. With the rapid pace of change in the information systems field, many new topics emerge each year for which valuable insights can be gained through the use of case research' (p. 371).

A case study will be defined here as follows (based on: Yin, 1989; Benbasat et al.,1987 and Lee, 1989). *A case study is an empirical inquiry that investigates a contemporary phenomenon within its real life context when the boundaries between phenomenon and context are not clearly evident and when multiple sources of evidence are used'.* In this

definition the unclear boundary aspect which is important in this study is emphasised. Information management is carried out in an organisation as a whole; the context is very important and information flows move throughout the organisation as a whole. This explains that the boundaries (of phenomenon and context) are not completely clear. The definition states that multiple sources of evidence have to be used in order to carry out a proper case study. In this study, official policy documents, interviews, conversations, formal and informal meetings and observations are used as sources of data (see also subsection 4.3.3). Benbasat et al. (1987) argue that by doing so, case studies can be used to document the practical experiences and to learn from them in order to develop knowledge and theories which can be offered to practitioners and other researchers.

4.2.2 Repeating phases

A working-sequence for case-studies and projects for qualitative research is shown in figure 4.2. A comparable phases approach can be found in many other sources, although sometimes different terms are used and nuances may vary (e.g. Yin, 1989; Benbasat et al., 1987).

```
Invention          Phase of preparation, or research design
   │
   ▼
Discovery          Phase of observation and measurement or
   │               data collection
   ▼
Interpretation     Phase of evaluation or analysis; this
   │               phase produces understanding
   ▼
Explanation        Phase of communication which may include
                   prescription and/or hypothesis generation
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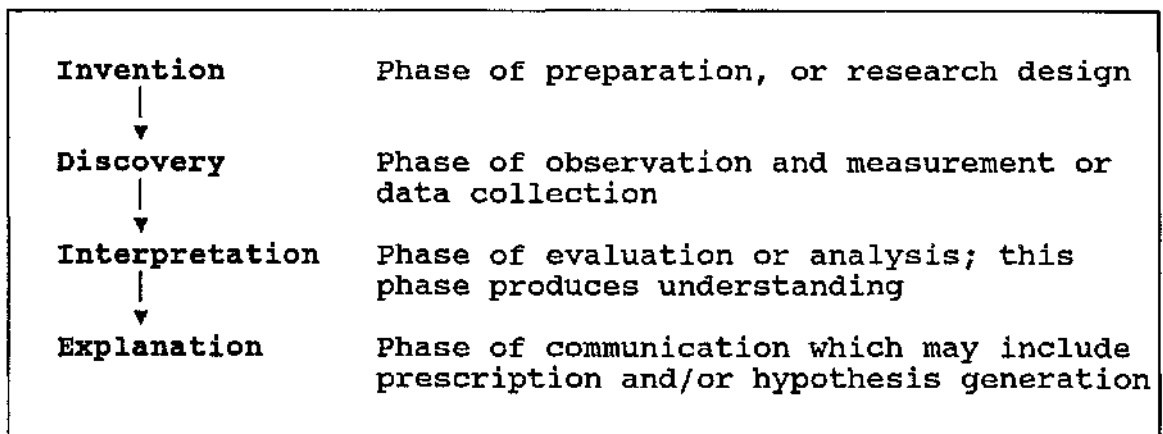
Figure 4.2   A phases approach for qualitative research (Kirk and Miller, 1986)

In this study, a representation of the preparation phase can be found in the first four

chapters, while a report of the discovery and interpretation phases can be found in the case study chapters (chapter 5 - 7). The cross-case analysis and explanations are reported in the chapter 8 and 9.

Such a phases-sequence, which is an often proposed working order, helped to order thoughts, to categorise data and literature and to write the report of the study. But as a matter of fact, the working practice evolved more into a repetitive process. Certain findings revised and extended the initial design, while other data implied the need for new observations. In this study, the results of a pilot case study in a polytechnic caused a reconsideration of the central problem to some degree. Another example of repetition of stages were the outcomes of the case studies which were partially carried out similarly and influenced each other. Questions raised in one situation appeared also to be relevant in other situations. Another example of repetition and reformulation was a case study within a Court of Justice which is not used within this thesis, in order to keep the study focused.

4.2.3 Key choices of research design

In section 4.2.1., the choice to use the case-study research strategy is explained. In this section, some additional questions concerning the research-methodology will be discussed. Easterby-Smith et al. (1991) describe some choices of particular significance in relation to research design. These five choices are summarised in figure 4.3.

```
Large samples              vs  Small numbers
Experimental design        vs  Fieldwork methods
Researcher is independent  vs  Researcher is involved
Testing theories           vs  Generating theories
Verification               vs  Falsification
```

Figure 4.3   Key choices of research design (Easterby-Smith et al., 1991, p. 33)

The first two choices were already made with respect to this study by deciding to use the case study research method. That method includes small numbers (just one or some sites) and fieldwork. In section 4.3, the issue of site selection and the number of sites will be discussed further. The third key choice with respect to the role of the researcher will also be treated in that section. In this section, the choice between testing theories versus generating theories will be considered.

Theories can be tested if the theory can be formulated in clear and operational hypotheses which can be verified and falsified. In this study, there is not such a theory. Some global expectations about the use of information systems in professional organisations (formulated in section 1.2 and chapter 2 and 3) are the basis of this study. This can be seen as an attempt to generate theory (and guidelines for practitioners) rather than testing existing theories.

Glaser and Strauss (1967) make a clear distinction between generating hypotheses and testing hypotheses and they assert that most sociologists spend most of their time testing, verifying and falsifying. They developed an approach known as *Grounded Theory*, which aimed to stimulate researchers also to generate new theory. This approach is formulated in their book *'The Discovery of Grounded Theory'* (1967). They perceive the key task of the researcher to develop theory through a comparative method. The researcher looks to comparable situations in different settings and tries to identify patterns or contradictions between these settings. This approach suggests the need to be open and without many presuppositions to data. During the data collection process and after this stage the data have to be analysed carefully in order to tease out themes, patterns and categories. Data should not be forced in deductive assumptions, but theories have to be developed which are close to the data.

I tried to use that approach by adopting an open attitude to the volumes of non-

standard data which arose during this study and to analyse that material in the way they propose. Easterby-Smith et al. (1991, p. 108 - 112) suggest a working order to use data to generate models and theory according the Grounded Theory approach. That working order (familiarisation → reflection → conceptualisation → cataloguing concepts → recoding → linking → re-evaluation) proved to be very useful in this context.

Glaser and Strauss (1967) propose two main criteria for evaluating the quality of a theory. Firstly it should be sufficiently analytic to enable some generalisation to take place. Secondly it should be possible for people to relate the theory to their own experiences, thus sensitising their own perceptions (verification *and* falsification). This makes it possible that the outcomes of the study will be useful for those in the situations observed, and that the outcomes are open to comment and correction by them (Glaser and Strauss, 1967; Turner, 1983; Easterby Smith et al., 1991). I have re-evaluated the main outcomes of this study against these two criteria, by discussing the Professional - Heteronomy model and the application of the Kraemer model with managers, professionals and IS-staff of professional organisations and by using this for further analyses. Another way of re-evaluation was by asking for reactions on parts of the case studies and by providing explanations to some people of the case sites who were willing to contribute to this. These discussions proved to be useful for further analysis and reconsideration.

4.3 SPECIFIC ISSUES REGARDING THIS RESEARCH-PROJECT

If the research question is defined and a decision is made to use the case study strategy, the researcher faces various questions such as: *how many organisations have to be approached?* (the single-case study versus multiple-case study problem), *which organisations have to be approached?* (the selection problem), *how to get access to these organisations?* (the access problem), *how to derive data from situations and from*

people? (the data collection problem) and *how to interpret these data in a responsible way?* (the interpretation problem).

Some of these problems are basically methodological but others are more or less political, philosophical or just practical. Each of the above mentioned issues will be discussed in this section so far as it is related with both case studies of this study. In each specific case study chapter, an account will be given with respect to the specific research aspects of that particular case.

4.3.1 Number of sites and site selection

The question whether to focus on only one case-site (single-case design), or to carry out some case studies (multiple-case design) has been discussed by various authors (e.g. Yin, 1989; Benbasat, 1984, Ghauri et al., 1995). In making this decision, the researcher should closely examine the research questions to be pursued and the generalisations that are hoped for, in order to make an adequate decision. Most research efforts require multiple cases, but Yin (1989) suggests that single-case studies are particularly appropriate in three situations.

> 'The single-case represents the *critical case* in testing a well formulated theory. This theory has specified a clear set of propositions as well as the circumstances within which the propositions are believed to be true.'
> 'If the case represents an *extreme or unique case.* This has commonly been the situation in clinical psychology, where a specific injury or disorder may be so rare that any single- case is worth documenting and analyzing.'
> 'If the case is *revelatory*. This situation exists when an investigator has an opportunity to observe and analyse a phenomenon previously inaccessible to scientific investigation' (p. 47 - 48).

A weakness of a single-case study is that the specific case site may turn out to be not so critical, extreme, unique or revelatory as expected (Ghauri, 1995). Because this study does not fall into the specific categories for a single-case study which Yin mentions (I did not assume that one of the case sites should be critical, extreme or revelatory), the multiple-case is most appropriate. A multiple-case study gives the

researcher the opportunity to compare different case sites, which will often provide a better basis for analytical and theoretical generalisations. Benbasat (1987) states that multiple-case designs are desirable when the intent of the research is description, theory building, or theory testing and that multiple-case designs allow for cross-case analysis and the extension of theory. For these reasons, multiple cases yield more general research results. Since the intent of this study is to describe the practice of information management in professional organisations and to build theories and general models on that, a multiple case study is more adequate.

In order to make this study feasible, a limited number of case sites had to be selected, which had to meet two main criteria. Firstly, the organisations or organisational parts had to be large enough: they were expected to have a separate general management, a number of IS-professionals and an operating core with professionals. Secondly, the key people of the sites had to be willing to cooperate with the investigations. Access to people, documents and meetings was needed to get an image of the situation. In order to make the sites comparable, I decided to choose two professional organisations in one field: hospitals. Hospitals are commonly perceived as examples of professional organisations where (among others) physicians perform the primary process. For example, Scott (1982) argued:

> 'Physicians perform the key patient care tasks within hospitals which administrators maintain. Both groups generally endorse the validity and the propriety of the distinction in spite of the obvious overlap in the actual functions of physicians and administrators and the impact of administrators and those serving under their direction on the provision of patient care' (p. 216-217).

Physicians have a long specialised training, are used to make decisions without external pressures (autonomy), have their own code of ethics and disciplinary law, and strong, influential professional associations. Partially through these attributes and as a historically developed tradition (see section 5.2) they can be characterised as professionals.

Information systems are used extensively in hospitals. Potentially, information systems *can* be used in all the mentioned directions of the model of section 2.4.4: professionalisation, deprofessionalisation, heteronomisation, autonomisation. Examples of each can be given from existing literature (see chapter 2). As a result of various developments, hospitals are in a state of change: more responsibilities for management, tighter budgets, more cooperation needed in cure and care processes. Kumar et al. (1993) argued:

> 'To help effect these changes, hospitals have sought to boost their cost cutting efforts by the introduction of computers and sophisticated management information systems. This has resulted in 18% rise in hospital information systems allocations, where such expenditures now approach 3,5% of the overall budget' (p. 220).

This makes it interesting to examine how information systems play a role in this change. These changes will be discussed further in chapter 5.

4.3.2 The access problem

The choice of these particular hospitals was mainly a pragmatic one: I had access to these hospitals. I was asked to do consultancy work in one of the hospitals, which made it possible to give an ethnographic character to the study (Easterby-Smith et al., 1991). Real involvement deepens the understanding because the researcher becomes part of the group under study. In the other hospital, some undergraduate students had placements in that hospital - they became a part of the hospital for a limited period and had access to people and documents. By contacts which developed while supervising those students, I was also able to get access to this hospital.

Various sources (e.g. Bryman, 1988; Beynon, 1988; Buchanan et al., 1988; Easterby-Smith et al., 1989) pay attention to the difficulty and the politics of getting access to organisations for research purposes. Organisations and researchers have different goals and it is not always easy to overcome differences in objectives or, indeed, in

culture and orientation. The main argument of Buchanan et al. (1988) is to adopt an opportunistic approach and to be flexible in using existing contacts with people of organisations. A researcher has to make appointments when there is an opportunity instead of waiting until all the preparations are completely ready. Not many organisations will respond to *a cold start*, e.g. when a researcher sends a letter with a request for cooperation with a research-program. This is certainly the case if such a proposed cooperation will be time consuming for the staff and if the research will not beforehand result in clear and measurable benefits for the organisation under research. This was the main reason to choose case sites through existing and mutual beneficial relations rather than looking for new sites. Because of those relations (supervising students and consultancy work) it became possible to gather information for research purposes. People were relatively willing and open to provide information for writing a case study, because they knew the students and the researcher by other than research reasons.

4.3.3 How data was collected

Because of the explorative characteristics of this study, it was important to be as open as possible to collect relevant data. Because the collaborating organisations differed, as did the way they wished to cooperate, it was not possible to collect completely comparable information. One organisation was relatively strict in making time available to cooperate, while the other gave more time and was very interested. One organisation possessed many written documents, such as information plans and strategic plans while the other hardly worked with written documents.

Different sources were used for these case-studies. These are described below. *Documents*, such as (policy)-plans, procedure descriptions and articles. These documents can be divided in internal and external sources. In both cases, also public documents, such newspaper articles and even a television documentary could be used

as sources. *Interviews*; appointments were made with people throughout the organisations. Some of these interviews were often relatively open ended conversations about the topics which the researcher brought to the fore. At the beginning of the research, most interviews were mainly directed to facts and situations, while the directedness moved to opinions and attitudes during the progress of the research. Some of the interviews were recorded (and later transcribed) when this was possible. The interviews varied in length (thirty minutes - two and a half hours) and purpose. Purposes could be: fact-finding, expressing opinions of the interviewee or verifying facts and opinions. Informal talks in canteens and other places also occurred. *Observations* are always made when a researcher visits a case site. Things such as conditions of buildings, the way people cooperate with each other and the differences between various working rooms were sometimes revelatory and explanatory. Observations were also useful for gaining an impression of how people behave and to sketch the organisation culture. *Participant observation*; in both hospitals it was possible to attend certain meetings and to observe IS staff and users. These observations provided information which is not easily obtainable by outsiders. The students were sometimes able to visit specific meetings which were inaccessible to outsiders. The major problem of participant observation -the internal, biased focus (Kirk et al., 1986; Yin, 1989)- is not very strong in this case because the researcher remained an outsider and the students were 'insiders' on a temporary basis.

An important advantage of working with students (compared with working alone) is that multiple observers may strengthen the reliability of a case-study. A disadvantage is that students are relatively inexperienced in research-work and that an experienced co-researcher should be preferred. This may be true, but additional problems (e.g. access to a case site as a trainee and too limited resources to hire experienced researchers for a longer period of time) would arise in that case.

In the other case, the researcher worked on a consultancy task in a particular

organisation, which provided access to people and the opportunity of making a case study simultaneously. This of course took place with the permission of the organisation involved. This approach can be called research by action instead of action research. Additionally, I was brought into contact with a person who did practical work as a trainee in one of the medical departments. This man provided me with information from a more medical point of view and he was able to bring me into contact with other people in the medical area. Through this contact, the advantage of multiple observers could be gained.

Easterby-Smith et al. (1991) distinguished different roles which a researcher can adopt.

1 Researcher as employee, when the researcher works within the organisation, alongside others, to all intents and purposes as one of them.

2 Research as the explicit role, when the researcher is present every day over a period of time, but this time entry is negotiated in advance. The individual is quite clear in the role of a researcher who can move around, observe, interview and participate in the work as appropriate.

3 Interrupted involvement, when the researcher is present sporadically over a period of time, moving in and out of the organisation to deal with other work or to conduct interviews with, or make observations of, different people across a number of different organisations.

4 Observation alone. This is a research role without any involvement.

For this research project I decided to choose a combination of 'interrupted involvement' by the researcher, and the 'researcher as employee' as a role for the students who cooperated with this project. These students however, had a temporary placement which entailed that they perhaps had more distance from the organisation than other staff. This combination of roles aimed to protect the work from possible one-sidedness of the researcher as employee.

In both of the case study chapters, a paragraph in the introduction gives a more specific description of the way data-collection was carried out in that site.

4.3.4   Validity, reliability and generalisability of this research

Various authors (e.g. Kirk and Miller (1986) and Yin (1989)) have tried to adapt the terms which are used in quantitative research into qualitative research in an attempt to define guidelines for researchers in the qualitative research-field. These criteria are summarised in figure 4.4.

Criteria	Meaning types & tactic		
Validity	Has the researcher gained full access to the knowledge and meanings of informants?		
	Construct validity	-Use multiple sources of evidence -Establish chain of evidence -Have key informants review draft case study report	
	Internal validity	-Do pattern matching -Do explanation building -Do time series analysis	
	External validity	-Use replication logic in multiple-case studies	
Reliability	Will similar observations be made by different researchers on different occasions? -Use case study protocol -Develop case study database		
Generalisability	How likely is it that ideas and theories generated in one setting will also apply in other settings? -Rely on analytical rather than on statistical generalisation -Consider the possibility of a 'multiple-case study' in order to strengthen the analytical generalisations		

Figure 4.4   Questions of reliability, validity and generalisability (based on Easterby-Smith et al., 1991; Kirk and Miller, 1986; Sekaran et al., 1992 and Yin, 1989)

In this study, I tried to achieve the *validity* criterion by using more sources of evidence (as described in 4.3.3), by asking some of the informants to review their contributions and parts of the complete study. I also used replication logic -asking similar questions

in different sites and checking if problems in one situation were similar in another. *Reliability* was sought by the use of a case study protocol and the use of a database to support the replication logic. The *generalisability* criterion was sought by performing two case studies and by verifying outcomes at other hospitals and other professional organisations through interviews and document studies. Another characteristic of this study is that it leads to analytical rather than statistical generalisations, which limits the scope for inaccurate generalisations.

4.4 THIS RESEARCH PROJECT IN THE LIGHT OF THE CATEGORISATION OF BURELL AND MORGAN

Applying the approach of Burell and Morgan (1979), which is explained in section 3.3, this research can be characterised as an emphasis on the subjective dimension. Various people were interviewed and (sometimes contradictory) written material was studied in order to get a rich image. Sometimes, this image implied conflicting interests and attitudes, while in other situations a non-conflict situation occurred. This is shown in figure 4.5.
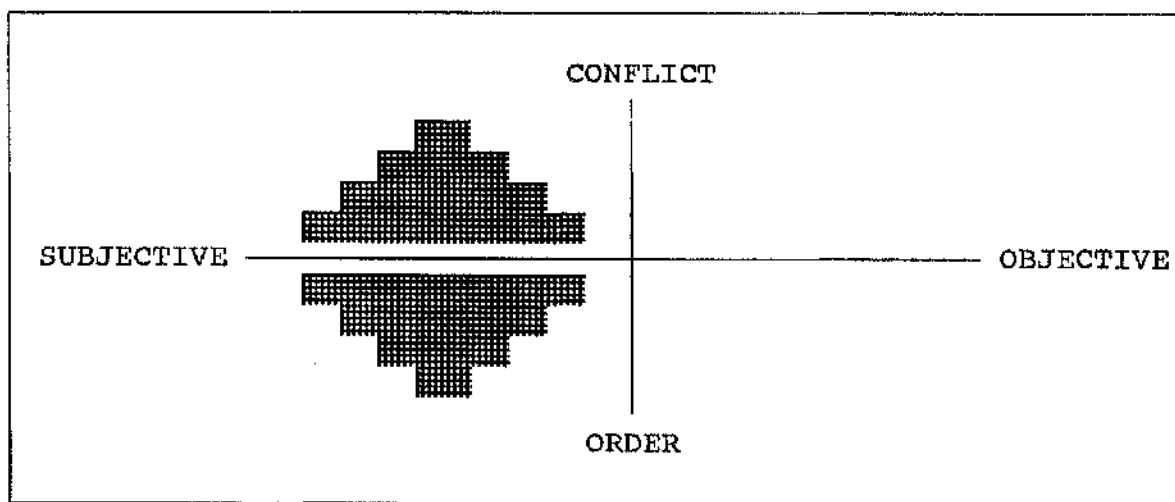
Figure 4.5   Paradigm of this study

In order to be able to categorise and use these different sources of information, some

of the alternative models which are explained in chapter 2 and 3 have been used for interpretation and analysis.

CHAPTER 5

HOSPITALS AS PROFESSIONAL ORGANISATIONS

5.1   INTRODUCTION

This study focuses on the information systems practice of two different Dutch hospitals as examples of professional organisations. This chapter discusses the context in which these hospitals have to work.

The historical development of hospitals in Europe will be discussed in section 5.2 and section 5.3 deals with some current developments with respect to hospitals where the Professional - Heteronomy model (described in section 2.4.4) will be applied to explain these developments. Section 5.4 discusses the physician as an example of a professional. Section 5.5 discusses the Dutch situation in the described context and gives a sketch of some current developments in hospital administration in the Netherlands. The appendix at the end of this chapter gives a short overview of the associations of physicians within that context. The case descriptions in chapter 6 and chapter 7 are examples of two different hospitals which have to deal with the context as described in this chapter.

5.2   HISTORICAL DEVELOPMENT OF HOSPITALS

The separation of responsibilities in hospitals for the management and the delivery of medical care is a phenomenon which can be reflected by a pendulum that swings from physicians to non-physicians and vice versa and emphasises that hospitals are really dual organisations.

During the early Middle Ages the only institutional health service in European countries was provided by cloister hospitals. The primary function of these institutions was caring for the disabled, the poor and the (chronically) ill. Medical treatment and

surgery was minimal. The clergy was responsible for both management and care. The organisational structure of the cloister hospitals reflected the hierarchy of the church.

In the 13th century the growing importance of the cities and the emergence of the guilds resulted in the establishment of a growing number of secular hospitals. From this time on, many hospitals were managed by representatives of the local government, the notables and the guilds, while tending the sick remained the principal task for the lower clergy. Because this lower clergy were primarily subordinated by the higher clergy and not to the hospital management, the organisational structure of the hospital consisted of a dual hierarchy, which caused tensions concerning the assignment of duties (Tap and Schut, 1987).

In the 16th century the first surgeons entered the hospitals. Most of them were apprentices of the guild of surgeons who had to learn the trade in hospital, while the established surgeons practised outside the hospital. These surgeons -who had a low status at that time- were followed by the 'doctores medicinae', who were educated at universities. Although their status was higher than that of the surgeons, the 'doctores' were subordinated to the trustees of the hospitals (ibid.).

In the 19th century, the physicians became more and more involved in the performance of the hospital and the frequency and the length of their visits increased. This was a result of the advance of medical knowledge. Hospitals acquired new goals, not only caring for people, but also providing them with adequate medical treatment. They also attracted the more prosperous people, partially by excluding the contagiously ill, the chronically ill and the incurable (ibid.).

Since the mid-twentieth century, the organisational structure of the hospital has been typified by two lines of authority: on the one hand, by the medical staff (primarily a collegial and professionally based structure) which is responsible for patient care; on

the other by the management and administrators who are responsible for the allocation of resources and the internal organisation. These are two different systems, the professional part which is horizontally organised and the bureaucratic part which is vertically organised. This phenomenon reflects important cultural differences. Harris (1977) argued:

> 'the hospital is actually two separate firms -a medical staff (or demand division) and an administration (or supply division). Each half of the organization has its own managers, objectives, pricing strategies and constraints' (p. 467).

And Scott (1982) stated about the same phenomenon:

> 'As physicians began to conduct an increasing proportion of their practice in hospitals after the turn of the century, the predominant mode of professional care-independent, entrepreneurial, fee-for-service practice-was simply extended into the hospital' (p. 217).

This agrees with the description of professional organisations in section 2.3, and more specifically with the description of the autonomous kind (subsection 2.3.2.1). The argument can be extended by professionalisation of the nursing profession, which explains that one can sketch hospital organisations through three boxes which are highly dependent on each other and which rely on various support and staff units. Figure 5.1 shows these three interdependent groups.
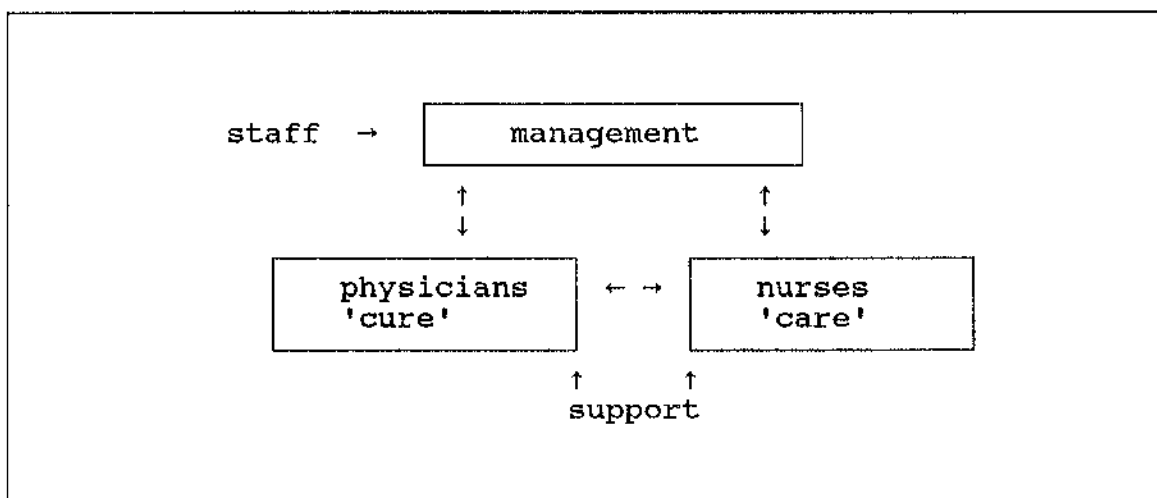
Figure 5.1   Three interdependent groups in hospitals

During the post war period in Europe, most hospitals were financed in an open ended mode. Such a situation of virtually unconstrained financial resources limited the potential conflict between the physicians on one side and the administrators on the other, but recent developments changed that situation.

5.3   CURRENT DEVELOPMENTS IN THE HEALTH CARE ORGANISATION

Many hospitals appear to be on the verge of a new era. The time of expansion has passed and has been succeeded by a time of consolidation. Funds are no longer unlimited, and will increasingly be curtailed by either the cost-containment efforts of governments or by competition and prudent buyers. Cost containment efforts in many European countries will be intensified, which may increase the tensions between hospital administrators and hospital staff. In the Netherlands, the open-ended payment system of retrospective reimbursement was replaced by a hospital budgeting system in 1983, while proposals are now being launched which smooth the way for selective contracting of hospitals by insurers.

Because of this increasing scarcity of the resources, the administrators are being exposed to growing pressure. This explains emerging conflicts between profession and administration which will influence the relative power positions of administrators/ managers and physicians within the hospital. This can be perceived as a classical professional - management conflict as described in section 2.2.3. (Alexander et al., 1993).

These external pressures explain the increasing role of administrators in many hospitals, which makes them moving from a relatively weak and low status position, to a more important position as being finally responsible. Fogel (1989) stated:

> 'While this subordination of physicians may vary from organization to organization, a trend toward placing greater power in the hands of the administrators is evident in health care institutions' (p. 18-19).

This results in many hospitals in an apparent division of tasks where the managers become responsible for the institutional management and resource allocation decisions, while physicians remain responsible for the patient care decisions. Since resource allocation decisions have profound implications for patient care, and vice versa, this separation of responsibilities implies a continuous source of potential conflicts. This can be perceived as an intensified battle on the autonomy - heteronomy continuum which is described in subsection 2.3.2 and elaborated in 2.4.4 and the models which are shown in figure 2.7 and 2.8. These developments may lead to different arrangements in hospitals between administrators and physicians. These arrangements can be represented by the Professional - Heteronomy model which is described in subsection 2.4.4.

1 A continuous battle over control and constant moves on the autonomy - heteronomy axis as shown in figure 5.2. This will occur when the power positions of physicians as well as managers is relatively strong and when physicians ignore or block change proposals. Mutual circles of defence are evoked and conflicts of interest become chronic. These organisations become a political arena.
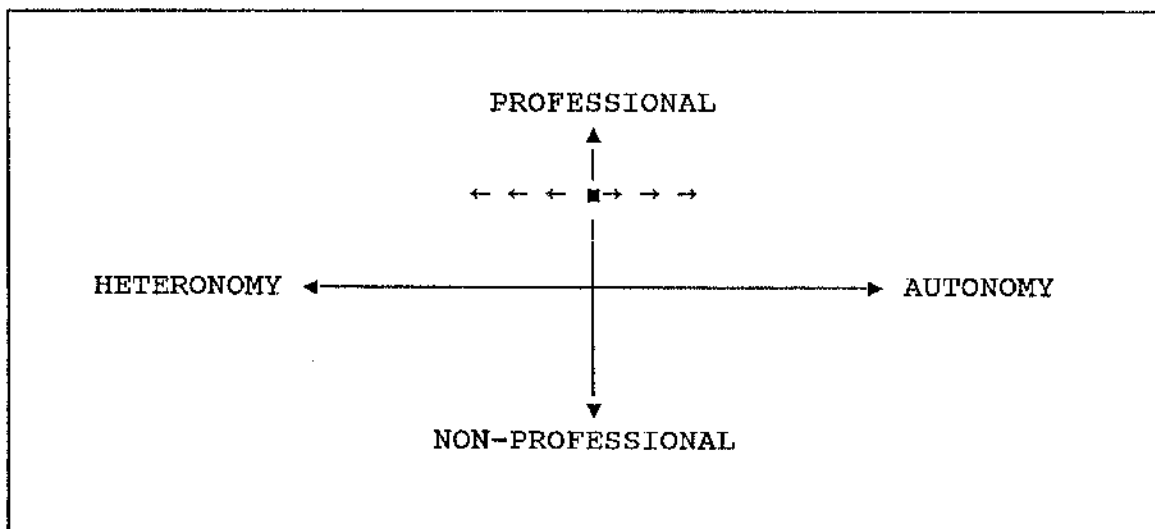
Figure 5.2   Possibility 1: Continuous heteronomisation - autonomisation battles

2   The *'administrators hospital'*, when the administrators can defeat or resist the power of the physicians. In such a situation, the most important resource decisions and decisions with respect to medical policy are made by administrators and hospital managers. These decisions will be carried out by the physicians. This can be classified as heteronomisation and perhaps as a move to Mintzberg's machine bureaucracy. This is shown in figure 5.3.
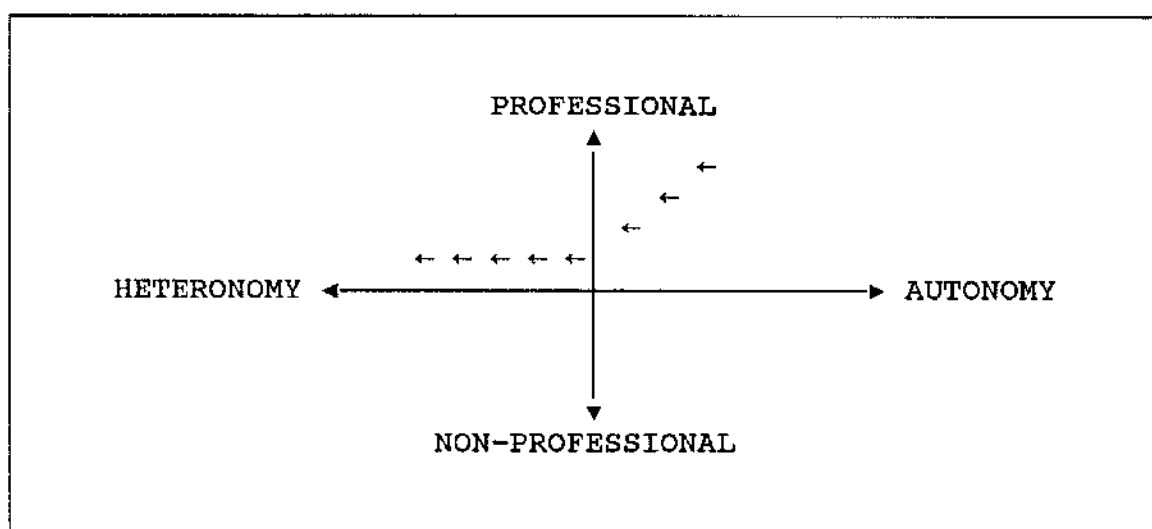
Figure 5.3   Possibility 2: The 'administrators hospital'

3   The *'physician driven organisation'* (Reed, 1985, p. 3281) when the physicians or their representatives gradually play a more active role in the management of hospitals and not only make decisions with respect to medical affairs but also with respect to finance and institutional policy. This should be a reunion of the responsibilities for resource allocation and patient treatment and care under one authority. This can be perceived as an escape from the dual organisation (Fogel, 1989; Reed, 1985; Tap and Schut, 1987). The physicians are protected against deprofessionalisation but they also become responsible for institutional management and macro considerations and decisions. Dawson (1994) states about this alternative:

> 'In many places, clinical directors have been appointed who, whilst retaining their positions as clinicians, are also now taking leading responsibility in

decision-making about, and implementation of, strategic and operational plans. They are finding themselves directly involved in such things as business planning and the setting and control of staff and non-staff budgets' (p. 11).

Such a change can be interpreted as a move from autonomy to heteronomy while the level of professionalism is not affected to a high extent. This move is shown in figure 5.4.
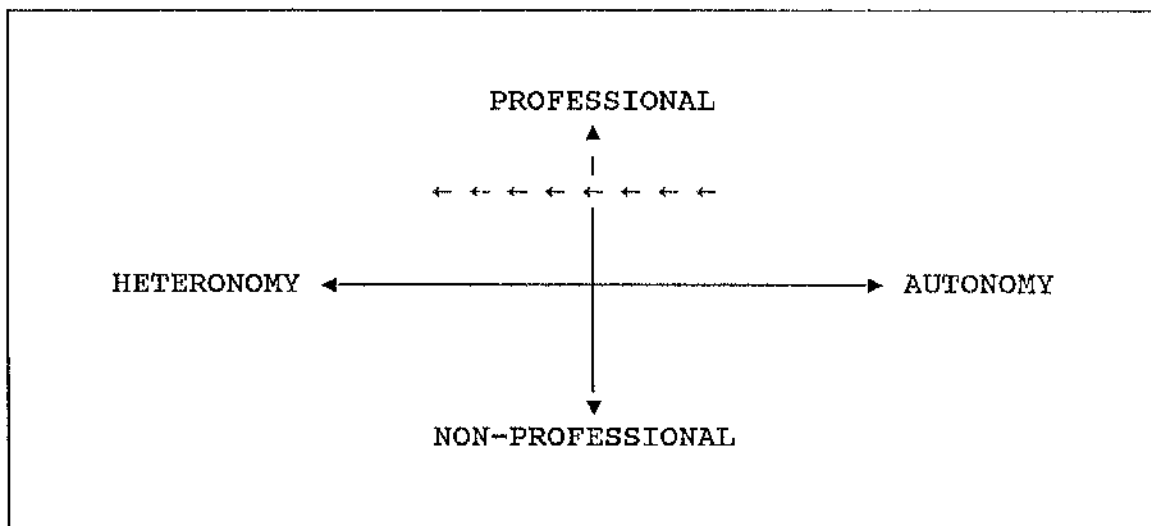
Figure 5.4   *Possibility 3: The 'physician driven hospital'*

Such a move could be started by making the physicians responsible for the budgets of their departments.

5.4   PHYSICIANS AS PROFESSIONALS

The medical specialist in a hospital comes close to the ideal of the professional according to many people: a high degree of specialisation, much autonomy, a strong link to the professional association and few possibilities of career development and accordingly not much hierarchy.

In spite of that, the medical professional tends to reduce the complexity of the work by bureaucratic means such as the standardisation and formalisation of labour

processes and hierarchisation of command. Standardisation and hierarchisation are typical symptoms of bureaucratisation. Standardisation of medical actions through protocols and fixed work-programs structures the work of the medical specialist to a high extent. The development of medical protocols makes progress in many medical specialisms, especially in surgical and radiodiagnostic fields. Besides, many unwritten rules such as 'juniors listen to seniors' and 'you get space if things run well, warn if you doubt' are very important in the medical practice. Fogel (1989) stated:

> 'The physician proceeds with two major activities: (1) categorising the patient's need in terms of the standard programs (diagnosis), and (2) applying or executing the programs. This process allows physicians to accomplish work without making decisions at every moment, as the programs are routine and well known among the professionals' (p. 17).

In some cases the formal and the informal hierarchies are important forces in medicine. In particular, expertise and seniority form a common basis for authority in medicine. Stevens and Philipse (1988) discovered that academic medical departments are more hierarchical than non academic departments because of the importance of education and research in medicine in the academic hospitals. Besides, the kind of specialism plays an important role. The same authors mention that e.g. surgical departments are more hierarchical than departments for internal medicine. The characteristics of the technology and the number of people who are needed for certain treatments (e.g. operations) are important. Stevens and Philipse (1988) found that diagnostical disciplines are less hierarchical than the therapeutical disciplines, such as surgery.

One can conclude that various forces influence the position of the medical professional and the hospital as a professional organisation.

1 Forces within the medical specialism. The increasing trend towards medical protocols and prescriptions and the possibility or need to differentiate functions within a certain treatment and to develop a command structure in order to manage certain treatments in an optimal way.

2 Forces within the organisation. Academic/non academic plays a role and the relation between physicians and managers, as explained in this section, is very important in the light of external pressures. Another internal factor is the relative power of the hospital management versus the physicians. Reed (1985) states that:

> 'Health care administration also possess a challenge to the autonomy of physicians. Reason dictates a need for quality administration in complex organizations, but the expansion in the number of health care administrators has been astronomical. Physicians who are disgruntled about increasing administrative impositions on their clinical time and volition will find that organizationally adroit administrators probably are doing precisely what their superiors expect - watching the bottom line, gaining compliance of all levels of the organizational hierarchy, and ridding the organization of its intractable members' (p. 3280).

3 Forces within the society such as increasing governmental regulations or the entrance of 'mega corporations in health care' (Reed, 1985) as in the United States, may influence the position of physicians considerably.

5.5   THE DUTCH CONTEXT

Most of the medical specialists in Dutch general (non academic) hospitals are free entrepreneurs, who are organised in partnerships according to their medical discipline. The hospital which will be described in chapter 7 is an example of such a hospital. This is an inheritance from the past, when most physicians had their practice in their homes, as described in section 5.2. Now, most medical specialists work in the intramural sector, but still have their private practices. Such physicians do not have a fixed salary but their salary depends on the number of medical treatments they perform and the agreed prices of those treatments which are prescribed by the National Board of Medical Tariffs. Consequently they play clinical as well as business roles.

General hospitals use admission agreements in which the admission gives the physician the right to use hospital facilities (an office, equipment, personnel) and the

hospital the duty to make these facilities available. The hospital management decides the number and the kind of physicians which they admit. The independent partnerships have partnership agreements in order to arrange the payment of goodwill for newcomers and other policy aspects of their company. After being admitted, it is hardly possible for the hospital to break that agreement. Only serious medical shortcomings can justify such a break. Such a high threshold reinforces the strong position of physicians in general hospitals.

The partnerships of physicians have an interest in the highest possible production (in numbers of treatments), while the hospital (which are a tenfold of the costs through these treatments) is bounded by a budget and consequently strives towards the limitation of expenses. National costs of health care amount to approximately f 56 billion ($\pm$ £ 20 billion) in 1994. The expenses for 5,000 - 6,000 medical specialists amount to approximately f 2,4 billion, which is just a small part of the total budget.

In most general hospitals there is no formal link between the financial administration and the medical administration. This means that there is not a clear insight into the relation between medical treatments and the costs which these treatments cause. Investigators found that there are major variances in treatment patterns among various physicians. The costs which physicians cause through these differences vary accordingly. The hospital which will be described in chapter 6 tries to deal with this problem by developing an information system which makes the relation between medical treatments and costs more visible.

There is a very unequal income division among various groups of physicians which depends on the highly arbitrary price-list of treatments. This list is legally confirmed in the 'Act on Tariffs of Health Care' (C.O.T.G.). Traditionally there are specialisms with high incomes: cardiologists, radiologists, medical micro biologists and pathologists and specialisms with low incomes such as: paediatricians, rheumatologists, allergolists

and revalidation physicians. A paediatrician stated (NRC Handelsblad, 29/1/93):

> *'Why am I always criticised as a money-maker, while other specialisms earn a multiple because they are more aggressive and they negotiate more fiercely than we do.'*

And a cardiologist, with returns generally four times higher than that of the paediatrician stated (ibid.):

> *'I am robbed through the lowering of our tariffs.'*

The Act on Tariffs of Health Care is very arbitrary; there is barely a relation between tariff and effort. Sometimes, treatments are claimed by physicians, which are actually carried out by nurses who are employed by the hospital.

The government has barely any grip on the expenditure for physicians and the differences among them because various interest groups of physicians within the National Association of Medical Specialists (see the appendix of chapter 5) such as 'The association of free professionals' and 'The association for the preservation of privacy' which defend the right of not publishing data which reveal the income differences. Many physicians say that they are not willing to work

> 'under the regime of the hospital management. Not because I should not trust the hospital management, but because we can do our work for patients better through the existing arrangement. We perceive hospitals and the physicians as two equal but different offerers of medical care' (stated by the Chairman of the Nation Association of Physicians in NRC Handelsblad, 29 January 1994).

One of them stated: *'what is the advantage of pressing us in a straitjacket?'*(ibid.) when people argued for the integration of physicians in the hospital.

Academic hospitals, which have not only a 'cure and care' task, but also objectives in the field of education and research are organised differently. The hospital as described in chapter 6 is an example of an academic hospital. The physicians in such hospitals do have an employment contract and are in service of the hospital according the university salary system. This should cause enormous differences between physicians with private practices with higher incomes and the physicians in academic

hospitals (not the worst physicians!) with lower incomes. To bridge this gap, some academic hospitals transfer the treatment money of the patients who are privately insured to the professors in medicine. Other hospitals pay the professors an extra bonus above their regular university income. This solution disconnects the relation between income and (number of) treatments and is for that reason an interesting option in the eyes of people and institutions who look critically at the costs of health care. Many hospital managers are promoters of such constructions in order to move to what they describe as the *'integrated hospital'*. This results in the hospital organisation in academic hospitals being fundamentally different from general hospitals through the employment contracts with physicians. In spite of that, many people perceive physicians in academic hospitals to a high extent as real professionals: *'they certainly exercise their autonomy', 'they have their power of expertise and their long tradition of professional autonomy',* as stated respectively by a hospital watcher/researcher of the National Hospital Institute and an IS manager of an academic hospital.

Change

There are various plans which aim to strengthen the position of hospital management. Health care insurers have also become more important and they have a more prominent position in the negotiation process about tariffs. One important interest group, the Dutch Association of Hospital managers (NVZ) pleads continuously for more grip on the activities of medical specialists. At this moment, the management of general hospitals have little influence on the behaviour (treatment patterns) of the physicians. Many physicians perceive the hospital still as a facilitary company, while many patients, the government and assurers perceive hospital managers for an important part as the responsible spokespersons. This perhaps explains the enormous turnover of hospital managers: it has proven to be an extremely demanding job (Alexander et al., 1993).

The association of hospital managers, assurers and some other parties believe that the income of physicians should not depend on the number of their medical treatments but should be fixed and should also depend on their dedication to the hospital objectives in which they work. Hospitals become more and more responsible for the quality and the efficiency of care and this makes hospitals responsible for the work of the physicians who are now independent. The public also has the tendency to hold the hospital more responsible than the treating physicians.

Hospitals and physicians are financially dependent on each other to a high extent. The hospitals are bound to a budget, which implies that there is no longer a place for the physicians in their role as independent entrepreneurs. At this moment, the hospitals can barely control their expenses, so long as the free physician decides about medical treatments. But the free physicians depend very much on the hospital, which invests in rooms, equipment, beds and personnel. Figure 5.5 shows this reciprocal interdependency between hospitals and physicians. This figure illustrates the discrepancy between the financing of hospitals on the one hand and the fee payment system of the physicians on the other.
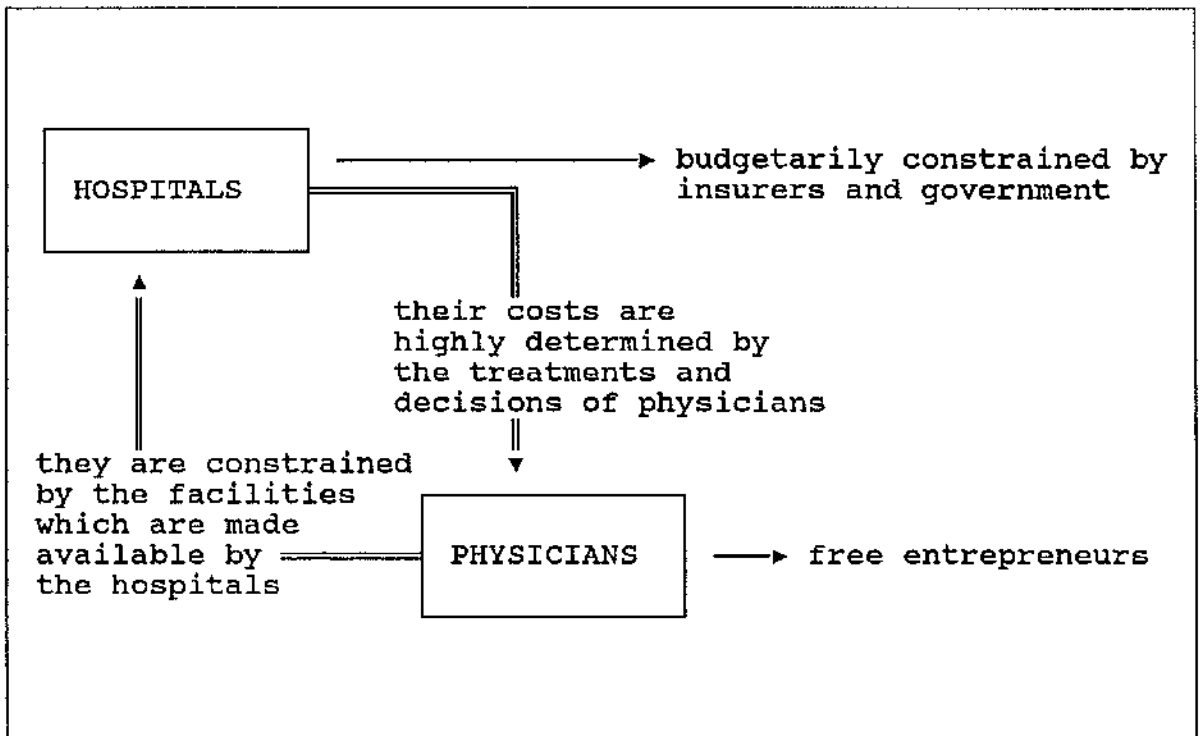
Figure 5.5   Existing relation between physicians and hospitals

This leads two partially contradictory interests. From the point of view of the physicians, fewer treatments result in a lower income, while more treatments result in a higher income. This is in contrast to the hospital organisation where more treatments tend to result in budgets being exceeded, while fewer treatments result in better cost control. Most physicians wish to retain the existing situation, while hospital managements want to control the treatment behaviour of the physicians in order to control their own expenses.

In mid 1993 a government committee, chaired by a former prime minister, Mr. Biesheuvel, made the following proposals to the cabinet to restructure the organisation of health care.

1   To integrate specialists in the hospital organisation.

2 To pay them a fixed gross annual income of £ 90 000 instead of an income which depends on the number of treatments multiplied by the price of those treatments, arguing that the existing situation could lead to over treatment.

3 To work in the direction of a contract of employment at the hospital instead of the membership of an independent partnership.

4 To abolish the payment of large amounts for goodwill (often one gross year income) by new physicians to the physicians whom they are replacing.

Other reports (Committee Strategical Re-orientation of Health Care, chaired by Van der Zwan, 1993; The Report of the National Board for Health Insurance, 1993 and the Dutch Association of Hospitals, 1994) also argue for a contract of employment within the hospitals or a subordination of the partnerships under the hospital management. Most physicians are against such a subordination or a contract of employment. The chairman of the Association of Academic Physicians calls for a greater involvement of physicians in the hospital management by making them responsible for certain departments, which are constrained by budgets.

In February 1994, the cabinet decided to follow the recommendations of the Biesheuvel report. This implies that physicians become an employee of the hospital in the future and that they get a basic income instead of a tariff per treatment. A national project organisation with representatives of family doctors, physicians, hospitals and the government are to elaborate on the proposals. Many people expect that it will take a long time before this project group has finished its work when they look to the composition of the project group. Physicians have already stated that they are fiercely against the Biesheuvel proposals. Certain lawyers question the legal possibility of dismantling the partnerships in the general hospitals. These partnerships are legally based through contracts and it is doubtful if it is possible to abolish these contracts in a one-sided way.

Appendix

Professional associations of medical specialists in the Netherlands

The physicians in hospitals are traditionally organised in one powerful association (LSV), but recent developments have divided them so much that two separations have led to the establishment of two new associations for physicians: one 'hardline' defender of obtained rights (NSF) and one progressive association with an alternative approach (NSG). There are approximately 12000 physicians, 70% of whom are organised (85% in 1981). 5500 of these physicians are organised in independent partnerships in general hospitals. 60% of them are members of the LSV (85% in 1981), 9% of the more radical NSF and about 5% of the alternative NSG.

LSV   National Association of Medical Specialists
The LSV is the oldest 'middle of the road' association which is the major interlocutor with the government about health care policy. This association has been very powerful for more than forty years (until the '80s) but is losing power through the rise of the two other associations and fierce internal debates about the future of health care. The LSV still has 'hawks' who plead for an emphasis on the protection of their material interests and the 'doves' who ask for quality improvement policies, better arrangements of working hours and more medical specialists in hospitals.

NSF   Dutch Federation of Medical Specialists
The NSF is the radical defender of obtained rights. They are very critical of the LSV with respect to internal democracy and that they are far too weak in the defense of obtained rights. They stated (NRC Handelsblad, 29/1/93):

> *'the patient is the central attention point for us. The relation between physician and patient must not be influenced by non medical considerations such as macro budgets and hospital management'*

They state that money does not have their highest priority, but they also said that (ibid.):

>*'the LSV defended our material interest inadequately'*

NSG Dutch Fellowship of Medical Specialists

The NSG aim at an alternative approach. They believe that the health care structure has to be modernised and they claim that quality, education and organisation in health care is much more important that the incomes of the physicians. They agree with fixed incomes of physicians and a contract of employment with hospitals. Their chairman stated (ibid.):

>*'It is time for a mentality change among physicians. More attention is needed for the interests of the patients. Through the existing system of payments, many physicians have got the mentality of a tradesman. They talk too much about their revenues, their little shop and they do not ask themselves if this is all in the interest of their patients'*

Furthermore, the *Royal Society for the Advancement of Medicine*, speaks on behalf of all the physicians. This society proposes rules, establishes ethical rules of behaviour, organises disciplinary courts and develops medical protocols. This society registers 27 different specialisms, controls medical education institutes and organises retraining for physicians.

CHAPTER 6

CASE HOSPITAL 1

6.1 INTRODUCTION

In this chapter, planning, implementation and use of information systems in a large hospital will be described, discussed and interpreted in context. The focus will be on the systems which may affect the work of professionals -the doctors and other medical people in this case- and the attitude of the professionals and their managers towards these systems. The four main questions are: 1) what is the organisational context in which the various groups in this hospital have to work? 2) what kind of information systems are used and will be used in this hospital?, 3) whose interests are served by these systems and who makes the major system decisions? and 4) to what extent do these systems affect the position and the work of professionals in this organisation?

Section 6.2 answers question 1 by paying attention to the strategy, structure and the culture of this hospital. Attention will also be paid to the position of the professionals in this hospital and some trends with regard to professionals. Question 2, 3 and 4 will be discussed in sections 6.3 - 6.6. Section 6.6 describes in more detail the implementation of a management information system, which is an attempt by the management to use information technology to increase its insight and its grip on the (financial) consequences of medical decisions. This description can be seen as an example of the use of information systems of one particular interest group to reach its goals and advance its interests. Other distinguishable interest groups use information systems for their particular purposes which illustrates that information systems decisions in this hospital can be seen as an arena where the various interest groups compete and collaborate in order to reach their preferred result.

This case study applies the Kraemer model as clarified in subsection 3.4.1 to describe how the various stakeholders in this hospital use systems to support their work and to advance their interests. Section 6.7 gives an interpretation and a discussion of the use of systems in this hospital. The Professional-Heteronomy model as described in subsection 2.4.4, is an additional tool for the analysis of this case study.

This hospital started using information systems for data processing purposes which were primarily directed to operational support processes such as invoicing and payroll. The management of information systems had mainly Skill state characteristics (Kraemer et al., 1989, see also subsection 3.4.1)). Later on, some professionals (physicians and departmental managers) discovered that systems can also help them to record data about treatments, to manipulate treatments data for scientific research, to manage supplies etc. Use of such local (and often not integrated) systems dispersed, which can be qualified as similar to the Service state (ibid.). The description of the implementation of a management information system (section 6.6) shows how higher managerial levels become aware of the potential of the use of IT for strategic purposes such as cost control, improving external relations and increasing grip on many organisational processes. Successful implementation of that system will imply a move to the Strategic state (ibid.).

This case study shows that it is not always possible to categorise computing in one of the boxes of Kraemer's model, as Kraemer suggests. The description implies that many new developments do not replace old systems and arrangements but will often be additional to the existing applications. An attempt to change the state of computing (Skill/Service/ Strategic), does affect the interests of people and is a potential source of conflicts.

The Professional-Heteronomy model can be seen as additional to Kraemer's model and pays specific attention to the organisational consequences of using information

systems in professional organisations. Putting the organisational consequences of all the system categories into this model makes clear that systems use in this organisation can be seen as a result of a bargaining process rather than as a result of a straightforward planning process. This consequently leads to multiform use of systems instead of one integrated and rational systems portfolio.

The description of hospital 1 gives an overview of how a professional organisation can move through the various congruent states of Kraemer's model and is moving in the strategic direction. This move can be explained partially by the weaker position of the physicians (compared with their colleagues in general hospitals) and unambiguous external pressures to cost control and efficiency. However, by interpreting the described context in the light of Kraemer's model, it seems hardly possible to categorise the mode of computing of this hospital into just one of the boxes. Section 8.6 of the analysis goes into this aspect.

The description of hospital 2 in chapter 7 will show how a stronger formal position of physicians can avert such a move to the Strategic state. That case description will partially be in contrast with hospital 1, but will also show similarities. Both cases will be compared and analysed in chapter 8.

I became involved in case hospital 1 as an external consultant for the Information Systems/Information Management (IS/IM) department during a period of eight months. It was my primary task to support the management of this department in the field of information policy formulation, knowledge transfer and policy verification. Before I started with these tasks as an external consultant, I obtained permission to write a case study about the use of information systems in this hospital as a part of a broader study. Through this arrangement, I had a free access to relevant documents and was also able to follow the developments during a longer period. Besides, it was possible to ask people of the IS/IM department questions which arose at that

moment, which was a significant advantage.

To get information from more perspectives, I also had to interview people outside the IS/IM department and it was -of course- each time necessary to ask them to contribute to this research. Not everyone was equally prepared, able and willing to cooperate. During the investigation, the IS/IM department was my primary entrance, but sometimes it was also possible to gain access to people and information with the help of others. This resulted in primary and secondary gatekeepers. One of these secondary gatekeepers was a person who did practical work as a trainee in one of the medical departments and who had relatively easy access to certain medical people. An important advantage of this case site is the size of the hospital. Because of the considerable size (one of the largest hospitals in the Netherlands), a lot of information is relatively easy to find, also in public archives and libraries.

I interviewed the director and other people of the IS/IM department various times extensively (sometimes meetings of more than two hours). I also interviewed, on three occasions, the project manager of the large management information system which will be described later. As additional sources, I had contacts with some of the project employees, with the responsible person of the board of directors, with some division managers and through the second gatekeeper with some departmental managers, with some doctors and with people of service departments (general medical services, finance and social/personnel affairs). The interviews were semi-structured and non directive. The duration varied from 30 minutes to two and a half hour depending on the availability and the answers of that person. After such interviews, I generally wrote an account of the meeting which I sent to the interviewee, asking them to check the correctness of the account. This often resulted in corrections of facts and often in an extra meeting or a telephone call with extra information. When people did not have objections to the recording of such interviews, I recorded it on tape, but sometimes there were objections and sometimes I did not ask because I felt that there would

certainly be objections or feelings of dissatisfaction about the recording.

Because of the access to this hospital which I had during three quarters of a year, I was able to observe the way things were running, to taste the atmosphere and to re-ask things, also during informal meetings. Access to internal documents, reports of meetings, policy documents and other information enriched the image of this organisation. After that period I still had access to some people, including the project manager of the MIS-project.

Some people who provided me with information did so strictly under the condition of personal or organisational anonymity. Others did not ask for such conditions. Because of these conditions, I have anonymised the whole case.

6.2 THE HOSPITAL ORGANISATION

6.2.1 General

Hospital 1 is a relatively large hospital in the Netherlands, allied with the Medical Faculty of a University. Nearly 3500 people are employed by this hospital, more than 1300 beds are available and there are more than 20,000 admissions per year and nearly 50,000 operations per year. The earnings in 1991 were ± ƒ 340 million (£ 130 million). Approximately 60% of the income was spent on the payment of salaries. Hospital 1 has one main building in a large city in the Netherlands and has a few minor locations.

6.2.2 Strategy

The formal strategy is articulated in the 'Report of Objectives 1993-1996, which is

published by the Board of Directors. Two important issues in this context are 1) the striving for *medical excellence in certain fields* in order to remain a top hospital in those fields and 2) the more *managerial/medical issues*, such as control over patient streams, standardisation of medical treatments, systematic quality improvements and cost effectiveness.

The hospital tries to develop formalised guidelines for treatments, which have to lead to improved insight into the effects of these treatments, more insight into advantages and disadvantages of treatments and insight into costs of treatments.

Another issue is the objective to get more insight into *patient streams* in order to tune this with the capacities and the budgets of the hospital. This issue will be elaborated in section 6.6, where the management information system will be discussed. This MIS is mentioned in the strategic plan of the hospital as essential for the enforcement of the implementation of the strategy. This policy can be summarised as the (top)managerial wish to increase grip on patients streams, treatments, and efficiency and effectiveness of treatments.

6.2.3 Structure

At the top of the organisation is a board of directors responsible for the policy and the strategic direction of the organisation as a whole. This board is supported by various staff departments. Below this top level, the organisation is divided into seven clinical divisions, three facilitative divisions and five general support staffs. This structure can be drawn as shown in figure 6.1. It is relevant to emphasise that this structure is global and represents the situation at the end of 1992. Division of tasks and minor changes take place continuously. The seven clinical divisions are: Internal medicine, Surgery, Cardiology, Children, Sense organs, Gynaecology and Psychiatry. The facilitative divisions are: Laboratories, Surgery and Research and treatment. The support staffs are: General medical service, Nursing and patients accompaniment,

Finance, economy and administration, Social affairs and Information Systems.
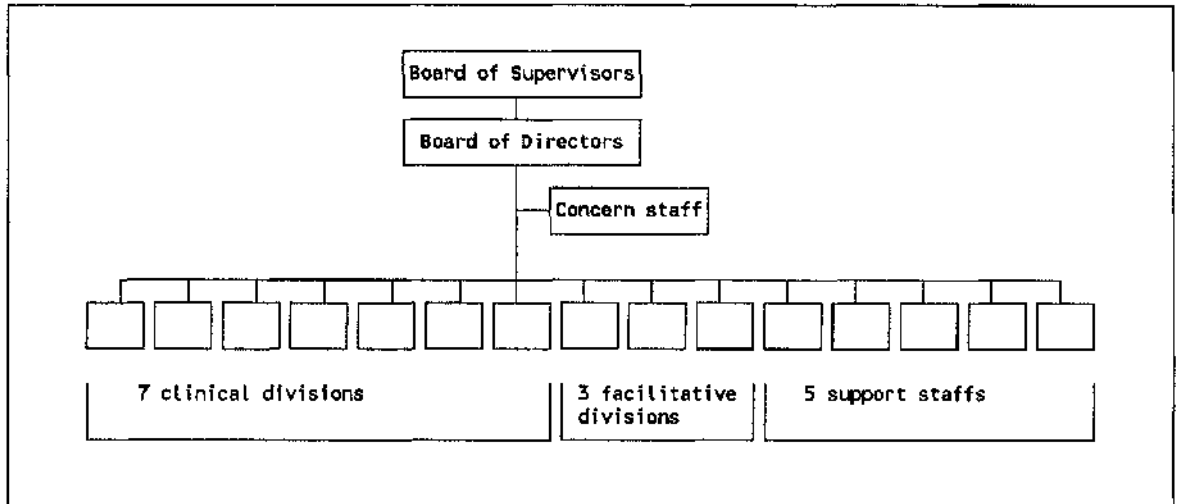
Figure 6.1　　　　*Global organisation chart of hospital 1*

Each division is further divided into departments, which are often medical specialisms. For example the surgical division includers departments of pulmonale surgery, surgery, experimental surgery, oral and jaw surgery, orthopaedics, plastic and reconstructive surgery, urology and dental surgery. These departments usually have a professor of that particular specialism as chairman.

Each division has a management of three persons (a medical professor as chairman, a nurse manager and a general manager) and they have their own staff. The intention behind this structure is that the divisions develop a policy of their own which aligns with the strategic policy of the top level. The board of directors are expected to define global objectives and limiting conditions as a framework. The divisions are - according to the strategic objectives- as independent as possible but there is still much tuning needed because of the many interdependencies between them. Patients are not interested in divisional borders and many need treatments from doctors and services in various organisational units (e.g. nursing and laboratories). This demands a high and increasing level of information transfer among departments and individuals, and

hence good communication systems. This is in contrast with the past, when doctors had private practices (sometimes in their own houses) and hospitals were used for nursing and advanced treatments, as explained in chapter 5.

One of the tasks of the central staff is to support the Board of Directors. Secretaries, advisors, communication and public relations people perform these tasks. Another important task is to control and to inform the Board about the outcomes of their observations and investigations. Corporate controllers inform the Board on the quality and reliability of divisional and departmental information. This task refers specifically to financial reports and other report tasks as well as the extent to which plans are actually carried out in the way it is agreed and subsidised by the board. With respect to each activity of divisions and departments, the board can choose to stimulate that with extra means, to allow it (without extra means for that task) or to forbid certain new activities.

Heads of departments, divisions and the board of directors are often doctors by origin. This is explained as a conscious policy of the hospital that the management has to operate close to the primary process and with a sound knowledge of medical work.

The structure as sketched above is the result of a reorganisation process, started in 1990, which was intended to make tasks and responsibilities clearer than in the previous matrix organisation. Costs, budgets and service levels were all unspecified which made it hard to make managers and other individuals actually responsible for their tasks. The informal organisation dominated the formal one and many unsolved problems, competency conflicts and border problems were pushed up to the top of the organisation. The Board of Directors had to solve too many operational problems which stressed their span of control. Besides, many individuals and departments complained about the influence of the Board on operational issues in which they sometimes intervened at the request of one of the parties.

The new structure is an attempt to decentralise and to transfer clear responsibilities to a lower organisational level: the division. Division boards have the task to carry out their own policy within general guidelines.

The coordination and the communication between divisions and top level and among divisions is increasingly formalised by systems, budgets, policies and guidelines. The coordination within divisions is not formalised to such a high extent. However, this depends of course on the size of the division involved and the number of divisional departments, because this can vary from 50 to 500 employees and from one to eight departments. Divisional management teams are free to develop coordination mechanisms in cooperation with the management teams of the departments.

6.2.4 Culture

It is not easy to characterise the culture of such a large organisation, which cannot easily be put into one cultural compartment. The decentralisation, the size, the mix of patient care and scientific research, the high educational level of most employees combine to give the impression of a relatively person oriented organisation, democratic, hard to change, managed in a rather participative style.

On the other hand, this organisation is in a state of change towards more structure and a more influential management because of certain external pressures towards efficiency and demands for value for money. This change progresses in an incremental and politically sensitive way (Mintzberg and Quinn, 1991) rather than in a clear and straightforward direction. Many of those interviewed mentioned cultural gaps:

i) between managers and staff-employees on one side and doctors, nurses and facilitators (laboratory assistants, analysts, but also cleaners etc.) on the other; and

ii) between doctors on one side and non-doctors on the other.

The first gap (i) can be seen as the difference in attitude between people who perform the primary process and the people who manage these processes (and their staffers). The second gap (ii) can be perceived as characteristic of a professional organisation. Some professionals, here the physicians, feel that they are the key part of the organisation. They argue that the other organisational parts and the people who are not doctors (whatever their function may be) are working to make the doctor's work possible. That perception divides people in professional organisations into professionals and facilitators. Figure 6.2 illustrates this. As a result, from a cultural point of view, five groups can be distinguished: doctors, nurses, facilitators, managers and support staffers. These groups act in practice in changing coalitions, which depends on the specific problem. In particular some non medical-managers on various levels asserted that the organisation is very hard to change and that some policies are contradictory and ambiguous. The informal power of some people and certain professional groups and the fact that many measures are taken but not controlled were mentioned as main reasons for this inertia (Keen, 1981).
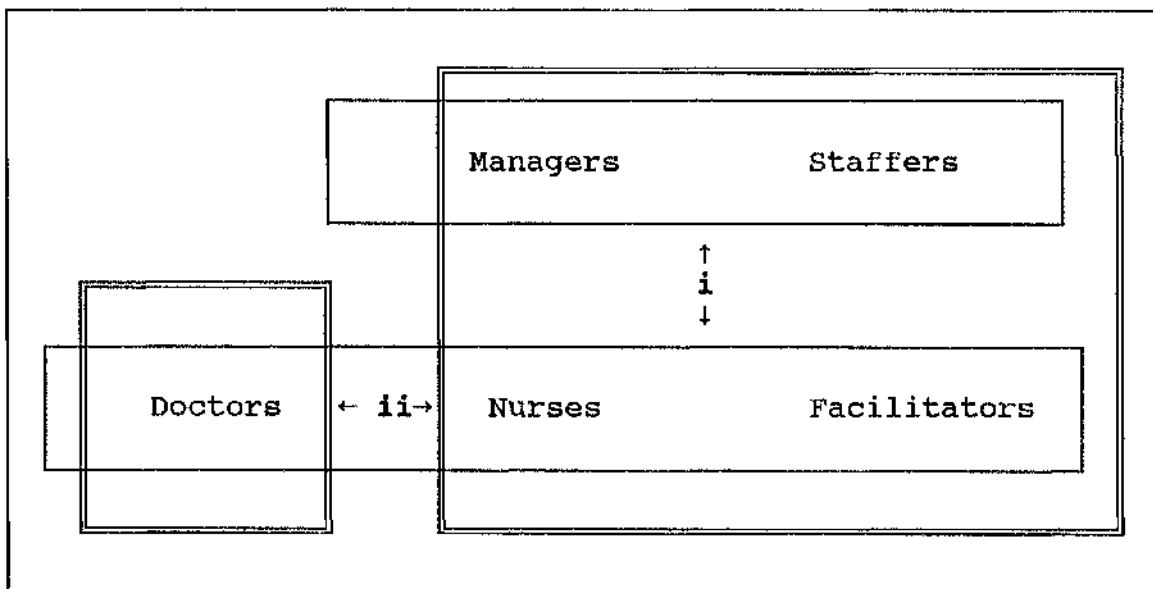
Figure 6.2   Various social groups in hospital 1

Examples of such processes are the strategic plan, which consists -among other aspects-

of many objectives whereby the means are not mentioned and the opinion of many people that the higher managerial layers perform a *small steps* (incremental) policy. By simply suggesting things at meetings and by realising small changes they attempt to change the organisation in a slow way without losing their own political space. A complicating factor may be that the various management levels are very conscious of the paradox between control objectives and managerial responsibilities on one side and the academic and professional climate on the other. This paradox is reinforced by the fact that many managers are physicians by origin. An IS-employee mentioned that planning in general and information systems planning in particular is dominated to a high extent by criteria such as acceptability and feasibility defined by the various powerful stakeholders rather than through advisability and desirability in general.

6.2.5 Professionals

The professionals in this organisation are the doctors who do their work in the various medical departments. The nurses who care for the patients are professionalising but many people view their place on the professionalism rank at a lower level than the doctor. The nursing profession is in a state of emancipation from a subordinate position to the physicians to an equal but different role in the treatment of patients. While to some a matter of debate, the main point for this purpose is that highly trained professional people perform the primary process of this hospital: treating and caring for people. This hospital is an academic hospital, which means that scientific research and the education of prospective doctors are an essential part of the primary process of this organisation. The academic aspect strengthens the level of professionalism because many physicians are not only appliers of a body of knowledge, but they also attempt to develop new knowledge and expect means (in terms of funds, time and space) to do so.

6.2.6 Trends with regard to professionals

Many interviewees mentioned that hospitals in general -but certainly this hospital- are tending to move from a segmented, loosely coupled organisation towards a more integrated and more tightly coupled organisation (Weick, 1976). Various reasons were suggested for this development.

- External (financial) pressures from the central government (to control health care expenses) and from health care insurers (who stimulate competition among hospitals). Society as a whole expects a higher performance from academic hospitals, while the total budget remains the same.

- Many patients are becoming mature and no longer accept discrete services from various departments or from individual doctors but expect closer cooperation among specialists, nurses and service departments. They perceive the hospital as the service supplier, rather than a specific doctor.

- Certain new medical insights indicate more links between different symptoms, which cannot easily be put into one medical compartment. Academic hospitals are probably the ones which are faced most strongly by this problem of interdisciplinary work.

- A hospital management which no longer accepts the role of only being a facilitator of the medical profession. In the past they felt that their only task was to provide the doctors with sufficient means to do their work. Societal trends, but also new insights in the field of hospital management and expectations from external stakeholders, mean that they want to take a more active management role. This phenomenon can be characterised as a professionalisation process of hospital managers. Increasing awareness of the importance and responsibility of their position, associations of hospital managers and business schools which are directed to hospital management, are indications of such a process.

- An emancipating profession of nurses who expect to become more involved in the treatment process of patients and expect to cooperate with doctors instead of getting orders from them. An increasing educational level of nurses and increasing medical

responsibilities contribute to this development.

These trends imply that more and closer communication is needed among the people who are involved in the various processes of the hospital. This can be called *increasing interdependency* (Thompson, 1967) among several parties which might be the main cause of the increasing role of managers and administrators. Some professionals feel that this increasing role of managers is a form of centralisation. *'Many decisions which were made in the past by doctors, are now controlled and influenced by managers'* is a quotation from a doctor. Examples included: purchase decisions, control of the efficiency of material use, budgets and report lines.

But it was also mentioned that this so called centralisation happens in a slow and ambiguous way. The top management however, does not agree with this centralisation vision. They mention that the latest reorganisation process (as described in 6.2.3) was a process of decentralisation and devolution. So, various parties perceive the latest restructuring process in different ways, from *'pure devolution'* to *'just a new hierarchical level'*. Division managers and departmental managers are now leaders of business units, with their own responsibilities. The top management agrees with the opinion that individuals -like doctors- have to cooperate more closely with colleagues and managers than in the past.

There are many powerful professionals in the lower hierarchical levels of the organisation who do not cooperate easily with processes which aim to improve integration, coordination or uniformation. A doctor mentioned:

> *'my profession is becoming bureaucratised. Many of my actions are recorded by systems and prescribed by procedures. A lot of time is consumed by meetings about budgets, procedures, common policies and other non-medical subjects'* and he continued: *'I just want to treat people and to make advancement in my knowledge to do so. That was what I always wanted to do. We have discussions among colleagues if we think that this is useful. The pressure from some managers and staff people to formalise treatments, to put things into procedures and to evaluate from the efficiency point of view is not my job.'*

Doctors with this opinion plead for more informal cooperation among professional people when there is a clear and concrete need for communication. Obligations to collaborate and to arrive at work-standards are -according this view- not always demanded by the physicians.

6.3   STRUCTURE AND DEVELOPMENT OF THE IS FUNCTION

Since 1975, the IS-department had been an automation service centre (in Earl's (1989) terms), first as a responsibility of the Finance department, later as an independent unit equal in standing to other service departments. This means that the services were free and that it was managed from one central point. The IS services were focused on broad and general information systems such as invoices, personnel and financial reports. The department developed or bought and adjusted such systems. After the implementation, they were responsible for the operation and maintenance of these systems. Since these services were free, the demands for new or enhanced systems were high and the department grew to more than thirty people, working in system design, programming and operations. That situation can be categorised as a Skill state (Kraemer et al., 1989, see subsection 3.4.1). Departments depended on the IS department, and that department made the major acquisition and allocation decisions. Technical IT expertise was the dominant factor.

In spite of this growth, the capacity was insufficient to meet demand. This led to dissatisfaction about the service level of the IS department and to many medical/support departments acquiring and running their own local systems. Many divisions and departments complained about the quality of the information and automation services of the central IS department.

An internal audit stated:

> *'there is a high degree of dissatisfaction about the centrally provided information and automation services. The complaints cover nearly the whole field of IS services.'*

This agrees with the assumption of Kraemer et al. (1989, subsection 3.4.1) that the Skill state will be characterised by problems with users.

The new policy of the last two years has been to decentralise certain IS responsibilities to divisions, which have to develop their own IS plans. They are expected to make their own IS plans within the limitations of the hospitals' technical infrastructure, and to design, implement, operate and maintain their own systems. New IS/IM (Information Systems/Information Management) staff have to operate as internal consultants in this field, offering support to the divisions, making and implementing their plans. This department also has to evaluate these plans in terms of costs, strategic alignment and the possible integration with other plans or systems. The people of this department and the divisional managers recognise the conflicting nature of this double role of assessor and advisor.

This policy move, which has not yet been fully implemented, can be interpreted as a move from the Skill state to the Service state (in Kraemer's terms, as explained in subsection 3.4.1). Divisions and departments will get formal IS responsibilities but it takes time to educate people to take these responsibilities. Divisional and departmental managers feel that the new control function of the new IS department is in conflict with the new responsibilities of departments and shows the ambiguity of such a decentralisation process.

Another major question is how to implement this policy of decentralising the IS function in practice. On the one hand, the hospital needs company wide integrated systems and a central body which manages, operates and controls these systems. On the other hand, there is a need for local systems to support local operations. These should be linked with the central system but to organise that is extremely difficult. Some divisions complain that they do not have the means (finance and expertise) to do so but most division managers appreciated that basic idea.

The IS support staff is divided into three departments: Automation, Information Management and Special Projects. *Automation*, with approximately 30 people, is engaged in the adaptation, implementation and operations of hospital-wide systems. They also develop new systems, sometimes on request and sometimes in cooperation with other people. *Information management*, with four people, are concerned with corporate wide information policy issues and with the support of divisions so that they become able to develop their own IS/IM-policy. *Special projects*, with a varying number of employees who come from other departments of the hospital (including IS staff), work on a temporary basis on certain projects. These projects can vary from the design and development of certain information systems, the adaptation of existing systems or projects for the development of standards with regard to data protection and connectivity of systems.

6.4 HOSPITAL INFORMATION SYSTEM

The mainstream of the operational information provision and formal communication among units takes place with the support of the Hospital Information System (HIS). This system was selected by the old IS department, which now feels that it is their main responsibility to maintain, extend and operate this system. It has many modules, connected with each other through one large database. The system can be accessed from 800 workstations and processes approximately 600,000 updates per 24 hours. Most of these systems can be called *operational systems* in Markus' terms (see also subsection 2.4.1, Markus, 1984).

The modules of the HIS were designed and developed by a foundation which develops computer packages for Dutch hospitals. The HIS has three groups of modules:

1 *medical modules* such as patient registrations, appointments, locations, medical registrations, operations and kitchen functions;

2 *financial modules* such as debtors, creditors, authorisations, personnel information,

out-patients consultations, output registration and invoices;

3 *general modules* such as connections with systems of other hospitals, scheduling functions, ad-hoc database queries and word-processing functions.

Most modules are used by secretaries (of doctors) and by staff people (such as employees of the financial department). The HIS is relatively old and has not influenced the work practices of doctors to a high extent. Some of these modules are used in a decentralised mode, such as appointments, while others are used in a centralised way, such as patient registrations.

Managers as well as doctors, nurses and support people have many criticisms about the value of the HIS. In the first place, it does not support managers and medical people in their work. Data which is retrieved from this system is not reliable and is often hard to retrieve. In other words: the people who bear the costs of these systems, in terms of workload, do not have equal benefits in terms of better information. The benefits are often seen by support departments, like finance.

Many managers feel that not all treatments which should be input into the system are actually input. That belief is supported by various internal investigations, which revealed that a clear interest of the department which is responsible for a certain data entry is essential for reliable data entry. That interest is not always there.

An important reason for this problem is that medical data have to be input several times: in a manual medical dossier of each individual patient and in the administrative record. Doctors insist on a medical file which is manual, paper-based and administered by the responsible central support staff. Besides, they often have a personal (hand-written or computerised) file.

After a certain medical treatment, the secretaries (and sometimes the doctors) have to translate the medical treatments into codes and terms which can be handled by the

computerised information system in order to complete this in the administration. This leads to invoices, financial reports, national medical recordings and connections with the nurse-departments etc. This procedure is shown in figure 6.3.
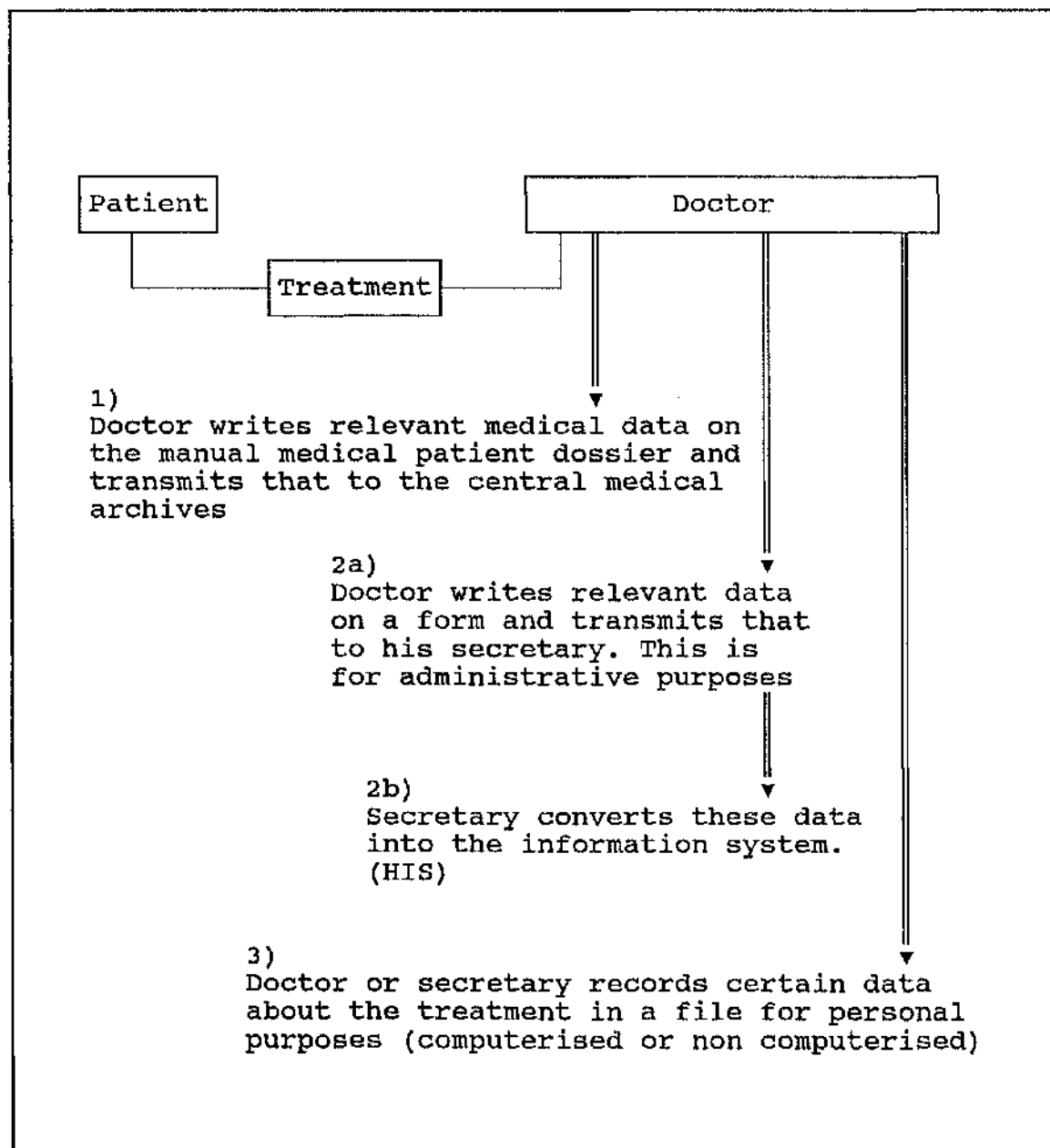
Figure 6.3   Practice with regard to the recording of treatments

The financial department also mentioned the unreliability of data as their most important criticism. The generalised practice as shown in figure 6.3 implies several reasons of the low data reliability and the low esteem of the system.

With respect to step 2a):

1 the doctor writes only the data on the form which he thinks are relevant;

2 the form does not always fit well with the treatment. Some doctors say that the form is too general to make a proper description of their treatments;

3 physicians and secretarial employees are not always acquainted with the regulations with regard to claiming certain treatments.

With respect to 2b):

4 the handwriting of the doctor is not always legible by the secretaries and may lead to interpretations;

5 the form does not always fit with the computerised system and sometimes leads to interpretations by the secretaries;

6 the doctors and the secretaries do not always have clear benefits from conscious input into the system. The benefits are usually for the hospital in general (e.g. to cash in invoices) and more directly for certain staff departments and higher managerial levels (e.g. attempts to create management information);

7 doctors experience the procedure as time consuming and not as useful with respect to their own work.

Procedure 1 (keeping up the hospital's medical file) is perceived by many doctors as essential for the quality of the treatments and as a part of real medical work. The professional medical education of doctors emphasises this aspect to a high extent. Most doctors are very serious in keeping up this file, although it is not easy to manage such an enormous manual file. Tracing systems are used in order to know where certain patient files actually are.

Procedure 3 (keeping up the doctor's personal file) varies from doctor to doctor. Some doctors (especially those who perform scientific research) are very serious in

storing specific data about treatments and patients, while others rely completely on the medical archive of the hospital as a whole. There is no overview of the various (computerised and manual) personal medical files of the doctors.

Interpreting the problems with respect to many HIS modules in the light of the organisational validity concept of Markus and Robey (1983b), as described in subsection 3.4.2, the invalidity arises especially at the *User - System interaction* and at the *Organisational structure - System interaction*. The User - System combination misfits because many users do not feel themselves supported by the system, because they are just responsible for data entry, while they do not always gain advantages of that input. The redundant recording of data is also a demotivating factor which diminishes the organisational validity of these systems. Besides, many doctors complain that these systems are not designed to support their work, but just the operational work of support people (invoicing, pay roll etc.). That complaint suggests that the modules do not fit with the working habits and practices of many users. These complaints refer also to a Structure - System misfit. People who should play a supporting role, dictate through systems their procedures to people who perform the primary process.

Management information is also derived from this system but is also held -for the same reasons- in a low esteem. Other main problems were the availability of the medical dossiers, the lack of integration among the various systems and the fact that doctors and their secretaries are not very conscious of the managerial, financial and business dimension of the organisation. *'Only issues of medical interest attract their attention'* is an often expressed grievance, articulated by one of the managers. Others say that physicians are asked to spend time on data entry while they do not get benefits from this. It is reasonable that they are not motivated to do so. A director mentioned the 'commitment of the physicians' as a major problem with respect to the implementation of modules of this information system. That problem can be interpreted as characteristic of Skill state information systems in a professional

organisation, where users (professionals) are powerful. The Skill state (powerful IS people) conflicts with powerful users.

The HIS modules are perceived by the Board to be relatively successful with respect to the financial administration and the support of laboratory processes. On the other hand, they are perceived to be disappointing with respect to the handling of the medical archive (important for doctors), the integration with real medical systems and with respect to the derivation of management information.

The HIS can be viewed as typical of the Skill state of the past. The operations of HIS need a lot of support from IS people and are not really designed to serve the daily work of medical people. Efficient use can only be realised through integration and an organisation wide approach, which leads to an increasing importance of the IS department. On the other hand, it is not easy to derive management information from these systems.

6.5   LOCAL INFORMATION SYSTEMS

Beside the HIS, many doctors, nurses, secretarial personnel and managers use their own systems, called *local information systems* -self made or bought- which are implemented on stand alone computers or departmental networks. Examples of such systems are: an operations planning system of a specific surgery room, systems which supports specific kinds of operations, systems which store medical data about patients of a doctor, systems which support diagnosing activities of a specific kind, local communication systems, systems for local store control, laboratory analysis equipment and local supplies management systems.

More than forty of these systems are used by groups of more than five people and many others are used by smaller groups or by individuals. It is not easy to maintain

the development and maintenance standards of the hospital towards these systems, because they are often built by amateurs (domain experts without professional information system design skills) or by people who are only responsible for designing that particular system. This makes it hard to connect or to integrate them with the HIS. Other problems are the lack of documentation, the lack of quality, the redundancy which causes inconsistency of data and makes them hard to change or to maintain. One of the people responsible for systems maintenance called most of them *'freakware'*. The information systems department tries to improve their quality by offering support when new local systems are built and by publishing development standards but this has rarely been effective until now. This illustrates the decentralised character of this organisation. Many employees tend to make their own arrangements in an informal way instead of asking or waiting for guidelines from managers or staff departments.

Because of the formal independence of divisions after the latest restructuring operation (subsection 6.2.3), it is not easy to oblige people to change or rebuild these systems in order to make them more compatible with other systems (like the HIS) and to give them a higher quality level. The existence of many of these systems, with a low quality (according to the IS-department's quality standards) but highly valued by some individual users is perceived as one of the hospital's biggest problems in the field of information policy.

The IS/IM director mentioned this issue as a typical problem for a decentralised professional organisation. He characterised many users and their needs in relation to information issues with these key words: informal, creative, fast, user friendly, IT as a tool and improving the current working practices. He characterised the basic approach of himself and his colleagues more as: verifiable development, efficiency, formal, integrated systems, cohesion and designing better working practices. He mentioned that it is not easy find a compromise between these two different attitudes and that

this often leads to misunderstandings and conflicts.

This attitudinal contradiction towards the application of information technology can be depicted as shown in figure 6.4.

	USERS	IS PEOPLE
Approach	Informal	Formal
Method	Creativity, incremental, intuitive	Standards, steps, planned
Results expected	Fast	Controlled
Directed towards	Improving current working practices	Redesign working practices
View of IT	IT as a tool	Directed towards integration and cohesion

Figure 6.4   Different attitudes of users and IS professionals towards the use of information technology

This contradiction in expectations, attitudes and views accords with a Butler Cox report (1992). This suggests that devolution of information systems responsibilities may lead to problems of understanding between line and systems staff. They summarised this in the following figure.

SYSTEMS MANAGERS' PERCEPTIONS OF LINE MANAGERS' FAILINGS	LINE MANAGERS' PERCEPTIONS OF SYSTEMS MANAGERS' FAILINGS
No clear service or business plans available	Inability to match information systems to business needs
No policy/political objectives set for information systems	'Decibel' planning of systems projects (those who shout loudest get service)
Failure to grasp management and organisational implications of IT	Preoccupation with the technicalities of IT
Lack of appreciation of technical complexities of IT projects	Failure to communicate realistic resource and timescale requirements
Failure to measure business benefits of information systems	Failure to market the business successes of information systems
Insistence on cost justifying all investments	Lack of measures to evaluate business benefits

Figure 6.5   *Perceptions of the failing of the other party from the perspectives of the systems manager and the line manager (Butler Cox, 1992)*

The entrance of these local systems can be seen as a gradual change from the Skill state to the Service state in Kraemer's terms (Kraemer et al., 1989, subsection 3.4.1). However, many users felt that they were not supported at an appropriate level by the IS department to develop and use such systems responsibly. As a reaction to that lack of support, they developed their own systems which may fit better with their own working procedures. Departmental and individual considerations compete in this case with organisation wide priorities. This case shows that a move from one state (here the Skill state) to another (here the Service state) can be supported by the major interest groups or can be the result of developments, practice, and/or battles. This implies the possible difference between the actual state and the ideal state.

Many of these local information systems are operational systems (in Markus' terms, see also subsection 3.3.1, Markus, 1984), but some doctors use them as a personal file for patient data, as a diary, or as a support tool for diagnosis. One doctor spoke of a local

system of his department:

> *'by making such a system on a departmental basis, we can meet a certain described need within a few weeks if we wish. Discussing such a need with other divisions, with the IS department and trying to make such a system as a company wide part of the HIS takes at least a year and does not always meet our specific demands to such a high extent'*

Examples of local information systems which are advanced knowledge systems are the system which supports nurses in the alarm room to judge the call for an emergency and the development of the system which interrogates people with psychological problems. This hospital experiments in several areas with new advanced technologies as research projects. Most of these systems are attempts to support the medical experts in their work and are nearly always initiatives of the experts themselves. In terms of the Professional-Heteronomy model, (figure 2.8 in subsection 2.4.4), such systems can be categorised as *systems for experts*, which may have the capability to be transformed into *expert systems*. The academic characteristics of this hospital explain the interest of certain medical scientists in the development and implementation of such systems. A doctor mentioned about his own system:

> *'I have made some systems for analyses of my own work. I make a rough scheme of the system, ask a student to build it and a secretary makes the data entry from the manual medical records. There are systems which I have built in one day and they are sometimes useful for years.'* And he continued: *'specifying my needs to non-medical people is not easy. And if they understand what I would like to have, they will often try to connect that with other systems in order to integrate'.*

Using the organisational validity concept of Markus and Robey (1983b) as explained in subsection 3.4.2 with respect to the local information systems, one can argue that there is a high level of organisational validity in the fit between users and systems. The users design their own systems and use them according their own wishes. In addition, it strengthens the power of powerful users who use these systems *(Power distribution - System fit)*. These systems may cause certain organisational invalidity through inconsistency and incompatibility which causes problems with other organisational parts *(Organisational structure - System fit)* and perhaps with the environment *(Environment - System fit)*. Certain external parties such as patients and insurers may be confronted

with data inconsistency as a result of different isolated systems.

6.6 IMPLEMENTATION OF A MANAGEMENT INFORMATION SYSTEM

This section describes the acquisition and the implementation of a computerised management information system in this hospital in more detail. The focus will be placed on the question of what the motives of the management were to acquire such a system, what the problems are which arise during such an implementation project and how successful implementation will affect the relation between managers and professionals. The introduction of this system implies a certain degree of heteronomisation and deprofessionalisation (in the terms of the Professional-Heteronomy model) and a move to the Strategic state (in Kraemer's terms). From those perspectives, it is interesting to study and describe such changes in more detail. In terms of organisational (in)validity (as described in subsection 3.4.2), this system may affect the *Organisational structure - System fit* and the *Power distribution - System fit*.

This section starts with a brief description about the availability of management information (6.6.1) and continues with the purchase of the system (6.6.2), the objectives of the implementation of the system (6.6.3), the essence of the system (6.6.4), the expected changes in working practices after implementation (6.6.5), the project organisation (6.6.6) and the attitude and expectations of the most important stakeholders (6.6.7).

6.6.1 Current working practices

Until now, the management has used budgets as the main means to control the use of resources of the hospital. Divisions and departments get budgets for personnel, for the number of treatments, for the amount of materials, for investments and so on. This budget is based on activity plans of the various budget holders in which they estimate

their activities in the coming period. Organisational units have to report monthly, quarterly and yearly about the extent to which the budget is spent and the planned activities are carried out.

This working practice is intended to prevent the hospital from incurring budgetary excesses. A staff employee in the field of finance mentioned:

> *'We know that we spent every day approximately f 1 million and that we earn every day approximately f 1 million. As a matter of fact, that's our only level of control.'*

That remark refers to his feeling that the current systems do not give enough information about the hospitals' performance. The hospital as a whole is financed by a fixed budget and some additional payments for specific activities. They have to finance all their tasks with that fixed budget. There is no insight into the costs per treatment and the possible deviations.

6.6.2 Purchase of the MIS

In response to the increasing need for management information caused by the developments as mentioned in subsection 6.2.5 and because of the dissatisfaction with the existing management information, the top management decided in 1989 to buy an extensive software package called *Management Information System* (MIS). They bought the package after an extensive demonstration from a foreign vendor.

They decided to purchase it mainly because of the managerial concept behind the system. This appealed to the beliefs of the top management about how a hospital should be managed. It also matched rather well the restructuring of the organisation (as described in subsection 6.2.3), which was intended to decentralise decision power to the various medical divisions, within the limitations given by the board. The system should be used to promote a hospital wide decision style, based on common data and based on a common managerial concept. The board believed that the system promised

to be a strong support for that approach.

At that time, the board did not consider extensively how the system would be implemented and the possible organisational change which the system might cause. The IS department advised positively about the technical features and the maintainability of the system.

MIS is a management information system which aims to use the data from the HIS to support the management of the hospital. The objective of this system is to improve the insight into the quality, effectiveness and costs of medical and nursing treatments. While the HIS has only registrative and transactional purposes, the MIS has to support the management with aggregated data about effectiveness and efficiency of the hospitals' operations. The top management desired data which would make it possible to compare certain departments with others or to compare the operations of this hospital with other hospitals in order to improve cost effectiveness. Figure 6.6 illustrates the various systems (HIS, LIS and MIS).

The costs of the system can be differentiated in purchase costs, the licence costs, the implementation costs and the operation costs. These costs are mainly organisational costs and software costs. The system can mainly be used on the existing hardware devices. There is no exact insight into these costs, but this overview gives an indication which is neither confirmed nor denied by the Board of Directors:

Pre purchase costs:	£ 40,000	*e.g. Orientation assignment, visit of team of eight senior people, to US, tests at own location*
Purchase costs of various modules	£ 1,000,000	
Licence costs ('89-'94)	£ 1,000,000	*'Out of pocket' expenses for the buyer*
Project organisation ('89-'94)	£ 2,000,000	*Salary and facility costs of the project team, costs of meetings, costs of several sub projects*
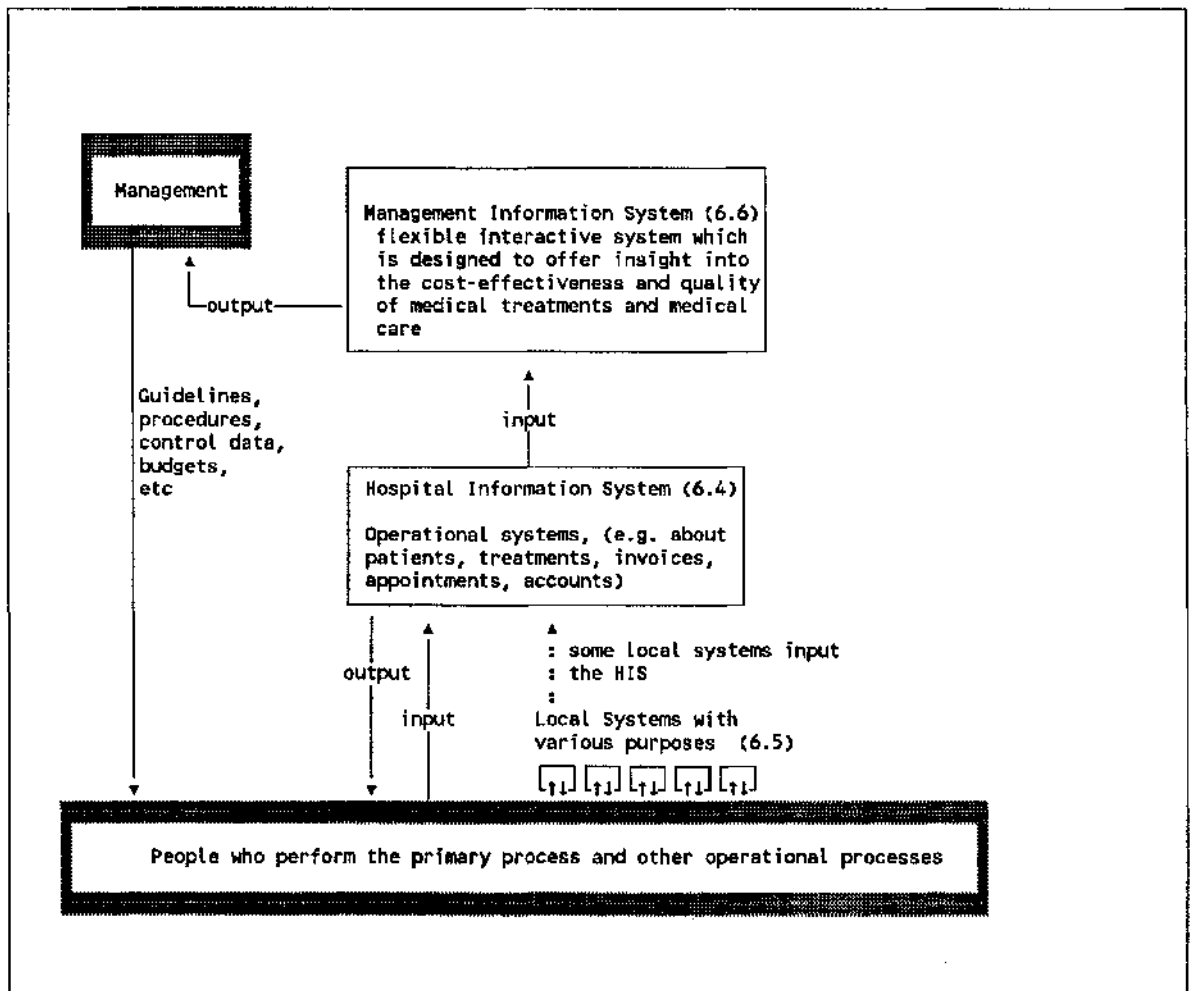
Figure 6.6 *Local Systems, Hospital Information System and Management Information System in their mutual relationships*

6.6.3 Incentives and motives to acquire the MIS

There were several reasons for the management to acquire the Management Information System. The first motive which was mentioned was that although management knows how much money they get for certain treatments, they do not know what these treatments cost. There is very little detail about the relation between revenues and costs. This makes it hard to carry out a medical policy to specialise in certain fields or in certain groups of patients. The MIS should make it possible to improve the insight into the real costs of treatments and groups of treatments and should support the management in making choices based on reliable financial data. The development of well-based medical policies, based on 'what - if' analyses with sound data is the ideal of certain divisional and top managers.

The second motive was that departments and individual physicians are now only given total budgets which they are not allowed to exceed (see 6.6.1). The promoters of the MIS suggest that it will make it possible to evaluate medical treatments of the various actors. Questions can be asked such as *'why does doctor A prescribe 30% more medicines than doctor B with the same specialism and a comparable patient population?'*, *'Why does doctor C prescribe an average of 5 hospital days after a child birth and doctor D 3 days?'* and *'How is it possible that department 1 has fewer patients than department 2 but higher costs?'*. The questions which can be asked by the management can be supported by data from the MIS and should be directed towards the *evaluation of the medical and nursing treatments*. It is generally known that there are significant variances in treatment methods and costs, in average nursing duration and in other medical costs. But there is no real insight into these differences based on hard facts.

The third motive was that some departmental managers, especially some division managers, feel that the tool will help them to manage their unit more directly with up to date data and to manage in -what is called- *a more medical way*. They hope that

individual doctors and nurses will become more cost conscious and that discussions about the costs and the effects of medical treatments will be based more on facts. Certain division managers feel that their current task is to compare budgets with expenses and *'push the red button if the budget is exceeded'*. They believe that they have poor and merely intuitive insight into the causes of such excesses.

A final motive was that external stakeholders, such as health insurers and the ministries of Health and of Education are insisting more information about the real costs of health care. At present, there is not much insight into the relation between production expressed in quality and the kinds of activities for health care on the one side and the available budgets on the other. The management hopes that this MIS will provide that insight.

These motives and objectives are summarised as *the improvement of the insight (for managers and professionals) into the quality, the effectiveness and the costs of medical treatments.*

6.6.4 The essence of the system

The system interrelates various business data such as demographic data, medical data and production and financial data with patient-groups. The demographic data and medical data (place, age, diagnosis, complications) indicate what kinds of patients have been involved. The production data (therapeutic and diagnostic treatments) indicate how patients are treated during their stay in the hospital. The financial data indicate what the treatments have cost.

At this stage, the indirect costs (such as staff costs) are ignored; the overhead costs are not divided among the various patients in an arbitrary way because that would not improve the insight into medical treatments. It could probably be a subsequent step to

divide these costs in order to be able to determine the complete cost price of treatments.

The essence of the system is that patients have to be grouped into patients' groups. The implementors (doctors and medical managers) have to decide on the criteria for determining such groupings. Besides, the various treatments of the hospital have to be clustered in relevant categories. The basic consideration is that the final product of the hospital (a healed patient or a finished treatment) can be accomplished by various groups of treatments, these are called intermediate products (see figure 6.7). When the system is operational, it would provide information about:

1 developments in the volume and the constitution of the patient population as well as the consequences for the numbers and kinds of treatments (intermediate products). The outcome can be related to the effectiveness and efficiency of the cure and care processes;

2 the consequences of these outcomes (see point 1) for the planning of personnel and equipment and investments with respect to the intermediate products. The result of this can be perceived in relation to the efficiency of the processes of the hospital.
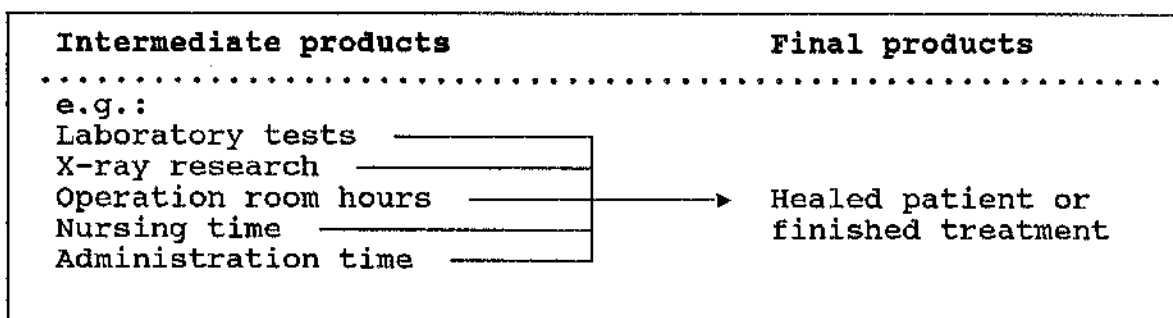
Figure 6.7   Example of intermediate products and final products in a hospital

Figure 6.8 shows that physicians and/or medical departments are responsible for the treatment as a whole, while certain support departments deliver intermediate products to carry out that treatment.
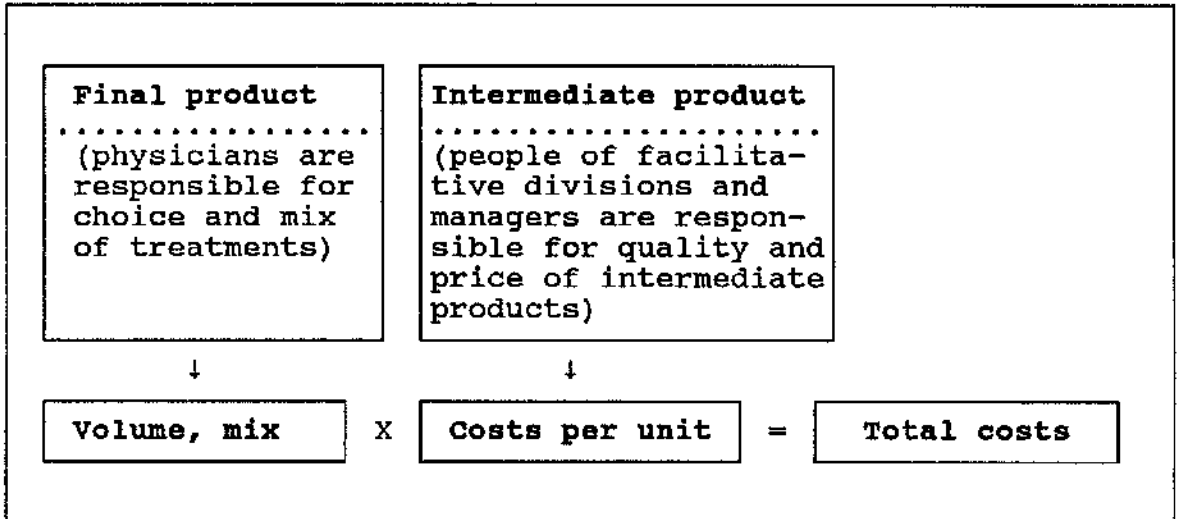
Figure 6.8   Responsibilities for costs in the hospital according the MIS concept

The information with respect to the efficiency and the effectiveness of the intermediate products and the final products can be used in the first stage as a mirror for the doctors. The information expresses as a matter of fact *'You are working in this way'*. After that first stage, the working habits of colleagues can be given as a means for comparison and discussion. Finally, the information has to be used to make agreements about treatment protocols which have to be complied with. This will result in a treatment profile for groups of patients as a result of a medical discussion which is based on hard facts. These agreements can be controlled by the administrative system in order to get a grip on the efficiency (and probably the effectiveness) of the hospital.

6.6.5 Expected changes in working practices

The (second) project manager stated in a report that the implementation and use of the MIS is

'the beginning of a long route. The main limiting condition for the success of the project is the acceptance of the users, that a more business-like approach of medical care is felt as a necessity in order to realise more efficient, and through

that, better care of patients.'

A successful implementation of the system may affect the working practices in various ways. These expected changes are described below.

1 Managers of departments, divisions and top managers receive information *to manage the organisation with more attention to medical work.* This is a major change in their working practices. The system will provide them with a resource of data which enables them to manage in a different way, and to discuss medical practices with doctors and with policy makers on higher levels. Besides, it may give them more responsibility, because they do not only have to control the budgets, but they also have to justify the way the budgets are spent. The system will provide them with information such as volume variances, price variances and efficiency variances of the cure and care processes.

2 This change for managers implies a change for doctors, nurses and other people who perform the primary process of the hospital. *Unified working standards, medical decision models and more discussions among colleagues and with managers about working practices* will be the ultimate result of a successful implementation. The system will provide groups of professionals with information about the way they treat (groups of) patients. This information has to be discussed, which will lead to the setting of standards. After that, the system can provide information which may reveal that groups of professionals or individual professionals deviate from those standards. That may cause higher pressure on individuals and groups to work according the norms.

3 *Not only managers, but also physicians, get a broader responsibility, because they become more involved in financial aspects of their (medical) decisions.* Until now, there has been a practice of divided responsibilities: the managers are responsible for the control over the budget and the physicians are responsible for the medical aspects. This results in -what is called- the *dual organisation* (Tap and Schut, 1987). By the support of the MIS, treatments become more standardised. It becomes no longer possible for a (group of) physicians to decide e.g. to buy a better but more

expensive artificial hip without discussing that extensively with their managers.

4 One consequence of the system will be that *individual professional autonomy will be reduced by the system for the benefit of the degree of control of the management.* Medical professionals who cherish their freedom to treat patients in a way only they think is the best, will feel the successful implementation of such a system as a threat. They will be obliged to discuss relevant medical data with colleagues and they will feel themselves controlled by managers, who will use that data to get insight into what happens.

This change can be drawn as shown in figure 6.9. This figure shows an increasing managerial influence as well as an increasing common space which will demand consultations, deliberations and discussions among physicians and managers.

Managers will get more information with respect to the use of budgets (the managerial area), but also about the extent to which the medical people work according to standards and which departments and physicians deviate from the standards. Physicians' medical decision space reduces through the standardisation effects of this system. Groups of physicians make agreements with respect to standardisation and the system has to monitor to what extent work has been carried out according to these standards. The managerial decision area of physicians increases, because they become more involved in business aspects of the hospital; they become involved in cost control issues, they get budgets and they will discuss these matters with their departmental managers.

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┌─────────────────────────────────────────────────────────────────┐
│  MANAGERIAL AREA          :    MEDICAL AREA                       │
│  ─────────────────────────:──────────────────────────────────    │
│  Without MIS:             :                                       │
│                           :        ┌──────────────────────────┐  │
│                           :        │                          │  │
│    ┌──────────────────────:─┐      │                          │  │
│    │  Managers' decisions : │      │  Physicians' decisions   │  │
│    └──────────────────────:─┘      │                          │  │
│                           :        └──────────────────────────┘  │
│                           :                                      │
│                           ↓                                      │
│  With MIS:                :                                      │
│                           :                                      │
│  ┌────────────────────────┬────┐                                │
│  │  Managers' decisions   :    │   Physicians' decisions        │
│  │                        :    │                                │
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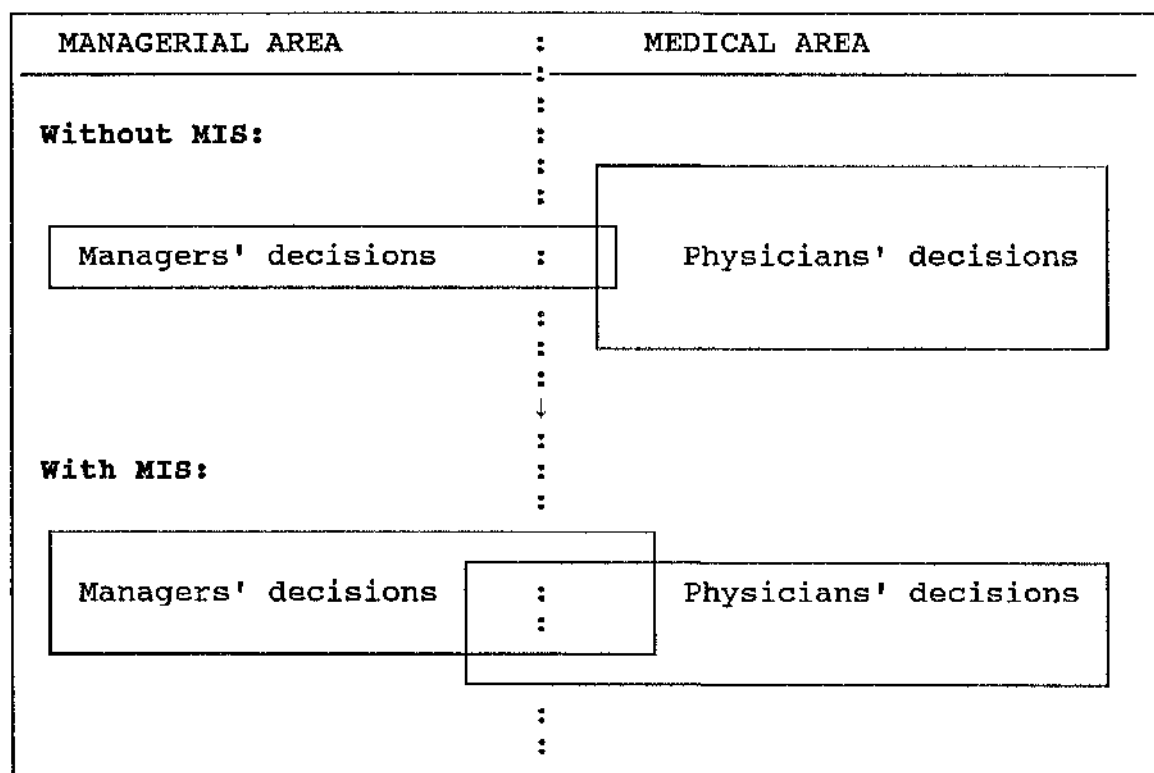
Figure 6.9   Changing decisions spaces through the MIS

The physicians become more responsible for the financial consequences of their work, while managers will insist more than in the past on the effectiveness and the efficiency of certain medical working practices.

These changes in decision space refer more to the practice of decision making in this hospital than to the formal responsibilities. The formal arrangements are clear: physicians take the medical decisions without managerial interference and managers decide primarily about finance, organisation and administration. In practice, these decision areas are highly linked: medical decisions affect capacities, people, budgets and organisation. Managerial decisions have impact on medical (im)possibilities. Since this is the case in practice, managers and physicians have common areas in which they

are involved. This system will be implemented with the purpose of providing information to managers as well as physicians with respect to this common area.

The reasons above illustrate that the successful use of the system implies a cultural change in working habits rather than that it just should be a new piece of technology. The quotation of the project manager at the beginning of this subsection verbalises this change. The common space of physicians and managers affects the professionalism of the physicians strongly, while managers get a new role beyond their traditional responsibility as facilitator.

6.6.6 Project organisation

Project organisation stage 1

After the acquisition, the designers of the system advised the Board to implement the system as soon as possible, following the so called *Rapid Implementation Approach*. After that rapid implementation, users should become familiar with the system, which could be adapted by the organisation to create the right fit. These advisers had good experiences with that way of implementation in other (foreign) hospitals.

The board of directors appointed a steering committee with senior people and a full-time project manager with seven part-time assistants. These assistants worked in various departments and to promote, use and adapt the system in their own division and department. The IS department was not greatly involved in this stage. The board believed that a high involvement of the traditional IT experts would not be advantageous for successful implementation.

The chosen structure was maintained for eighteen months without any success: the system was not adapted in a usable way, neither the middle management nor the top management used it, and the seven assistants felt isolated in their own departments,

experiencing the disinterest of medical people and local managers.

Some people (the current project manager, the member of the board and the IS/IM director) mentioned the following reasons for this failure.

- There was not a strong project team. The project group consisted of a full-time project leader with seven 'satellites'. Each satellite showed a lack of (system and hospital) knowledge and worked in his/her own direction and was too 'low level' to get real attention from departmental key persons. The selection of project employees was more based on the criterion 'being interested in computer based systems' than on 'being influential, important or skilled in building networks'.

- The project leader became isolated and did not have a clear vision about the way of implementation. Besides, he was an engineer and lacked a medical background. These characteristics made him suspect by medical people. The project manager was previously a staff employee/advisor of the Board.

- The steering committee acted as a control group which had the task of controlling the progress of the project group. They did not use their influence to support the implementation in the organisation. They just asked in two-monthly sessions what progress had been made in the latest period. Afterwards, that was an overly passive 'easy life' approach.

- No one acted as a 'champion', a 'promoter' or a 'sponsor' of the system (Boddy et al., 1992). The board supposed that the implementation would not cause serious problems and that implementation was roughly equal to a moderate operational system. They did not want to spend too much capacity and attention on the implementation of this system. The acquisition was a strategic decision but the implementation was an operational activity. They did not see the cultural change aspects of a successful implementation at that moment.

Project organisation stage 2

After eighteen months, the Board member responsible stopped the original project and replaced it with a totally new project organisation. The former project employees were

all placed elsewhere or dismissed where temporary positions were involved. A new project manager was appointed, a cardiologist with management experience. He already had many contacts with doctors and managers and has strong charisma. He obtained permission to appoint a full-time project team of five persons from different disciplines: a management assistant, a financial economist, an information analyst, and two medical informaticians. This team was located in the same hall as the Board of Directors in order to create a small physical distance. The project manager could always meet the responsible Board member if he wished.

The project-leader had contacts with the divisions and the departments via the division managers. He organised regular meetings with all the division managers and with the responsible board member. He stated:

> *'This is a very tricky process. Only a whole-hearted commitment from the board and from the division top managers gives a chance of success. If one of these parties send lower-level representatives, the project will sink. I expect that the board-member is present during the meetings with the division-top in order to make him co-responsible for the success of the project and witness of possible divisional resistance. I negotiated these conditions before I started with this job.'*

The project group started in the beginning of 1991 with their work. Important tasks and problems to solve for them and for prospective users were 1) to classify patients, 2) to classify intermediate products and 3) to improve the HIS.

The first task involved grouping the enormous amounts of data by which patients can be characterised into homogeneous groups. Medical homogeneous groups are based on related syndromes and treatments. These groupings of patients and treatments had to be specified by divisions and departments, since well thought out groupings are a basic condition for useful information. This task can only be carried out by a high participation of doctors and nurses, as only they can make groupings in a sensible way. These activities were performed by a working-group who had:

- to make an overview of existing patients classification systems and the data needed to use these;

- to consider the main advantages and disadvantages of each system in relation to MIS and the hospital and

- to choose a classification system, including the conditions necessary to implement it correctly.

The second task was to define treatments in so called intermediate products. Such products have to be relevant from a medical, a business and a financial point of view. The usability had to be evaluated with people on the workfloor who create such intermediate products. In a pilot project radio-diagnostic treatments (1039 distinguishable treatments) were grouped into 10 intermediate products.

The third task was to improve the quality of the HIS which would feed the MIS. It is well known that the HIS did not always contain reliable information (see section 6.4), which would make the reliability of the MIS also doubtful. As the project manager mentioned: *'Only a serious MIS by a serious HIS'*. Better procedures and other attitudes towards the HIS are a critical success factor for the MIS. This is a sub-project of the MIS project, called *administrative organisation*. Other tasks are to improve the connectivity with the HIS, to make the MIS (technical) continuously available for prospective users, to inform people about the progress of the project, to design a procedure which prescribes to managers how they have to use the system and to develop procedures about the maintenance of the system. Some of these tasks can be carried out by individuals of the project group, but sometimes they have to cooperate with the IS/IM department, with the finance department or with people on the workfloor.

The new team started two and a half years after the acquisition. After eighteen months, the work was progressing and the plan was to start with the implementation in some divisions at the beginning of 1994, five years after the acquisition. The project manager mentioned that important issues for him in relation to the management of

this project were:

- *top management commitment*; this means a constant feedback of developments and progress to the Board of Directors and -sometimes- to demand their cooperation to use their influence;

- *user involvement*; by asking them to cooperate with the installation of the system, by developing or improving procedures or by designing categorisations, a certain commitment can be won, which may be useful in a later stage. This involvement implies that it costs a lot of implementation time; this is a reasonable consequence. User involvement also implies that the project manager attempts to move the potential political battle between various affected groups forward in order to promote the acceptability when the system will be actually implemented.

- *the appeal to responsible managers to collaborate.* He demands rather strictly from divisional managers and from departmental managers their cooperation with the implementation and use of the system in their unit. That can be done in their own way, but he urges on budgetary punishments if certain managers do not cooperate in a loyal way.

6.6.7 Attitude and expectations of various stakeholders towards this system

I have tried to uncover expectations and attitudes of some stakeholders of this MIS. This is not a simple or uncontradictory task. Especially people with a more sceptical, critical or doubting view will not always be open about their perceptions, because such openness can threaten or weaken their position (Keen, 1981). Besides, many people who will be affected by the system after implementation do not yet have an opinion at all (Boonstra, 1991a, 1991b). During 1994, the implementation was started but the real change should be made during the subsequent years. The project management intends to implement firstly in a technical and free way, but the real consequences of the system in terms of changed responsibilities and changed culture (as shown in figure 6.9) will be felt during the subsequent years.

In spite of that, some people -supporters, opponents and those who are indifferent- have given their opinion, and some of their views are quoted below. These quotations are followed by an interpretation of the attitude of stakeholders to the MIS.

Doctors

One problem in forming a view is that many doctors do not have an opinion at all, saying that they hardly know about the system or that they are not interested in staff affairs. Possibly because of this, it was not easy to find doctors who are willing to spend time to discuss such an issue. Four doctors have given an opinion which may give an impression of broader felt opinions about the system. Doctor 1 mentioned:

> *'The system is focused on costs of large aggregations. That is the power of the system. A weakness is that it is not focused on the quality of medical treatments. A certain doctor can operate in a relatively expensive way and I think that the system will pick him up and ask for the attention of the manager to this 'problem'. But that doctor may be excellent in his work and kind to his patients. That's why this system reveals a very small area of our work.'*

This doctor emphasises that the MIS uncovers just one aspect of medical work which will then be given too much emphasis, while other relevant aspects remain uncovered. This doctor feels this one-sidedness as an important problem. However, doctor 2:

> *'I don't know at all what things cost. The costs of medicines are unknown to me, but certainly the costs of treatments, the costs of staying in the hospital for one more day. I am interested in information about this dimension of my work. The medical aspects will always come first but it is useful to know something more about costs.'*
>
> *'I am open for a discussion about the reduction of costs with the same quality standards. But I hate paperwork and these things must improve our thinking about medical treatments and not increase the amount of paperwork. From that point of view, I suspect this system of being bureaucratic and formalistic.'*
>
> *'Another issue is the long duration of the implementation and the failure of the first implementation. I believe that these troubles are symptoms of the enormous complexity of the implementation.'*

This doctor expresses the view that doctors cannot be accused of being disinterested in costs of treatments, simply because they are a doctor. He would appreciate clear information about the costs of certain treatments, so that he can consider that aspect

during the decision processes about treatment plans of patients. He actually expects more and better information about this dimension. He would welcome a simple system with cost information in tables and suspects this MIS of introducing bureaucratic procedures and time consuming formalism. The long duration of the implementation strengthens that feeling. Doctor 3 said:

> 'The main problem -as long as I am a doctor- is that the non-medical people speak another language from those who treat patients. They are interested in other things, use other words and emphasise things which seem unimportant to us. Things which strike us leave them unmoved. I am sure that the information which will be provided by the MIS will be unimportant for us or unimportant for them. Important for both managers, staff people and medical people is nearly impossible.'

> 'Developing guidelines for treatments is very interesting work -for some people- as well as analysing the outcomes: causes of variations and similarities among treatments. The problem is in using such guidelines. It is a bit boring to work a lot according to prescribed rules and it is very irritating that other people control the extent to which one operates according to these rules.'

This doctor emphasises the semantic problems between managers and medical staff. He feels that these groups are directed towards different goals and that they are interested in different things. This leads to different jargon and to communication problems. Something similar was described by Liesveld et al. (1990) when they argued that the available information will be perceived, esteemed and interpreted totally differently by managers and medical specialists. They state:

> 'The vision of the medical specialists and the management is more than only different. A basically different approach towards the problems in health care in both groups plays an important role here' and 'medical specialists who are responsible for the patients care perceive patients from their own medical point of view, which is completely different from the point of view taken by the accounts department, whose attention is primarily focused on cost control' (p. 133).

The quoted doctor probably thinks that it should be promoted that managers are just facilitative and leave the medical affairs to the doctors, in order to minimise border conflicts.

The other aspect which is emphasised by this doctor is about guidelines for treatments.

Such guidelines improve the verifiability of doctors, but this doctor (and with him many others) doubts whether it is wise to implement such guidelines for control purposes. Many experts believe that it can be helpful for the medical profession to develop (eventually worldwide) guidelines on how to treat people, but that such guidelines should primarily have supportive purposes for the physicians themselves rather than be a control tool for the management. This is a matter of debate in the medical world, and could be characterised as a typical professional - management conflict as discussed in subsection 2.2.3. Doctor 4 said:

> *'it is actually four years of bullshit from staff people who don't know anything of medical work. I am sure that after implementation -if it will ever come so far- the system will be removed because nobody uses it or a new and more sexy system will conquer the managers' minds.'*

This doctor expresses a scepticism which is certainly felt more broadly. It raises the question about the management of projects with a long duration, with many dimensions (technology, culture, structure, responsibilities, contradictions of interest) in organisations with a dispersed power division (Keen, 1981; Markus, 1983a). This doctor also mentions the probability of simply non-use of the system after a 'successful' (technical) implementation.

Middle managers

The following quotations are from various managers and aim to characterise their feelings with respect to this system. Some of these managers have a medical background (e.g. former doctors), while others have a more managerial or health care business background. A division manager mentioned:

> *'Until now, I have only focused on my budget. I have to use all my money, because the top management takes residues away for general purposes. Deficits are more fatal because the hospital is punished for deficits at hospital level. This means a poor budget directed style of management. I hope that this system will give me the information to manage in a style which is more directed towards the real content of the primary process.'*

This quotation refers to the broader feeling among managers that they are responsible for their part of the hospital, but that they do not have the information to fulfil that

responsibility. More information about real costs of treatments and about deviations will support them in their responsibility. Another division manager said about the use of the system:

> *'the system seems very difficult. It uses many terms which have never been used before in this hospital and which have little meaning to me. Maybe it will be easy when it is actually in use, but now it seems very abstract to me.'*

and about his expectations of the specialists' attitude:

> *'I think that certain groups of medical specialists will be very interested in the system and will use it in order to analyze and evaluate their medical treatments among each other and to develop standards. Many others (complete specialisms) might disregard the system and might resist obligations to use it. For these reasons I am not sure of the success of the system.'*

The last quotation refers to the fact that doctors are not simply a homogeneous group who will have the same attitude towards this change. That will depend -among other things- on culture, style and atmosphere in the various departments. Medical departments with -traditionally- a strong team spirit and a participative management style will perceive this change as easier and more logical than departments where doctors work primarily on an individual basis, with a low degree of cooperation with their colleagues and with a facilitative management style. Such differences reflect a difference of perception of 'being a professional'. A departmental manager/professor complained:

> *'as a start we had to categorise all the (approximately 1200) treatments of our department into ten or twelve so called 'main treatments'. Such an activity can only be thought out by a costs focused book keeper of the administrative department. They don't even know what we are doing here. We treat people and try to help them, we do not categorise them into pigeonholes. Implementing and using such systems takes so much time. Nobody has really calculated how much such a system costs, only the package costs approximately f 3 million per year, but the costs of implementation are at least 20 or 30 times higher.'   'I only attend the MIS-management meetings because I am obliged to do so, but I am very sceptical. We are not a factory.'*

This sceptical opinion reflects that we cannot simply speak about a professional - management contradiction. There are certainly managers who are sceptical about this change. They feel comfortable with their current style of management and probably

feel that their intuition and their medical background gives them enough knowledge and information to manage their unit adequately.

Besides, this quotation illustrates that (middle) managers have to choose in the tension between standing close to their workers (like this manager) and close to the actual medical processes versus committing themselves to broader goals, financial efficiency and a more managerial attitude. A division manager stated:

> *'I believe that we cannot evade a more cost focused development in hospitals in the near future. I think that it is better to be proactive and to anticipate on such a development in our own tempo than to wait until we will be obliged to do so by external institutions'* and *'it strikes me that the implementation takes so much time and effort.'*

These quotations illustrate a contradictory attitude in comparison with the foregoing manager. This division manager believes that this hospital anticipates an unavoidable trend and that being proactive is the best attitude towards such changes.

Top manager

The quotations below are some characteristic parts of an interview with the responsible member of the Board of Directors. The quotations show that this manager has a strong vision about the way a hospital has to be managed in the future. This can be characterised by the key words *'cost conscious, efficient, effective and quality'*.

He believes that the medical profession (not only in this hospital but more broadly) is in a state of change. The classical concept of professional autonomy should be reconsidered by the doctors in the light of various developments. In the first place, there are patients who are becoming mature and critical and more and more like a true customer. They no longer accept the doctor who decides about treatments without justifying himself towards the patient and society. In the second place society (including politics and insurers) expects a responsible and approachable hospital management who feel themselves really responsible for the hospital as a whole. Such a responsibility

can only be taken by better information and by other attitudes of the people who work in the hospital, especially the doctors and nurses.

He believes that these changes demand another concept of professionalism among the physicians. No longer an isolated position, without many influences from patients, society and management, but an attitude directed towards cooperation, justification and having a broader responsibility than simply the narrow medical care of one particular patient. They should accept influence from managers, from patients and they should include the demands of efficiency as well as effectiveness in their medical considerations. He stated that there are still too many doctors, -not specifically in this hospital but in the country as a whole- who show a complete disinterest in the (un)controllability of medical health care and who are only focused on the narrow interests of their individual patients. Among other things he stated:

> *'the (MIS) system corresponded extremely well with our view of how this hospital has to function in the future. Not only management by allocating budgets, but also based on cost prices, cost control and agreement among specialists about optimal treatments.'*

about the project management:

> *'it is true that we underestimated the complexity of the implementation. We supposed that a quick implementation and adaptations afterwards was the best strategy because then it is visible and imaginable by the users.'*

> *'After that first phase, we considered the possibility of stopping the project. An important reason to continue was that the awareness of a more managerial approach to govern hospitals was started. We believed that it was just then important to continue and to use that awareness.'*

> *'we attempt to make clear to everyone that the Board thinks that this is a crucial project. We have appointed a strong project manager with a sound medical background (..), we have appointed other highly skilled people with various relevant backgrounds and we try to show commitment. We also demand that division managers commit themselves to and collaborate with implementation in their own units.'*

MIS Project manager

The project manager who is responsible for the implementation of MIS said:

'I think that it is critical that more people, not only managers but also doctors and nurses, perceive a hospital as a company with cared and treated patients as a final product. This product needs the highest quality standards, but also treatments which are directed towards the best effect and the lowest costs. Many people are now only directed towards their own narrow discipline without a cost orientation and with varying quality standards, everyone for his or her self. MIS is not only a new package, is another mentality, a turnaround for many people. That makes the successful introduction so extremely difficult and duration so long.'

'If it will become a success? I don't know. I'll do my best during my contract period but I can't guarantee such things.'

This quotation illustrates a broader feeling that it is unclear that the system will ever be implemented *and used* in a successful way. The project manager was honest with respect to this point.

'real implementation of this system can threaten vested interests because it opens certain areas which have been closed until now. More people have to justify themselves among colleagues and that is not a nice message for everyone. But I believe that such new working habits can also make the work more interesting and challenging.'

This quotation strengthens the earlier mentioned opinion that the attitudes of physicians will differ among the various departments. For some of them, it will be a form of job enrichment because of the challenging discussions with colleagues and managers about medical treatments.

'I had not expected that an organisation wide implementation of such a system has so many consequences and so many complexities. Many departments have always worked independently to a high extent. Such a new hospital-wide concept is very difficult.'

This quotation -also reflected by the member of the board- illustrates the initial underestimation of the project from an organisational point of view.

Summary of the attitudes

It is not easy to give a sound overview of the attitudes of important stakeholders towards this system without a more thorough and broad investigation on this specific issue. Interviewing more people, or distributing an opinion poll was -given the circumstances- impossible. But some things can be stated without a high risk of inaccuracy.

1   The failure of the first attempt to implement this system made many people careful about making overly far reaching statements about the success and the usefulness of the system. Even the current project leader was not confident that this system would become a success. That failure has created some scepticism, criticism and carefulness about giving too high a commitment.

2   Each affected party knows that the Board of Directors adheres very strongly to a successful implementation and use of the system and that they will use many means to reach that goal. I felt that this makes some people careful about expressing themselves too critically about the usefulness of the system, even under the condition of anonymity. The first attempt to implement the system was somewhat indifferent and sluggish, but this second attempt is so demanding, top down and expensive that open resistance and discussions about the usefulness and realisability are very sensitive. This explained a waiting and cautious attitude among many participants.

3   People who perform the primary process are not yet affected by the system. For this reason, it is not easy for them to give their opinion about the usefulness and the implications of the system. Many of them do not have a clear image of the changed situation with this system. Only people who are actually involved in the implementation process have a clearer view of the impact of this system on their daily work.

4   Some doctors see advantages, often from a scientific point of view. To develop guidelines for treatments can be a challenge for certain doctors. One doctor said that he thought that such a system may have more success in an academic hospital

because doctors in such hospitals should have *'a more critical attitude towards their own practices and more open towards comradely criticism and new and better ways of treatment'.*

5 Indifference and resistance can be expected because the system clearly has uniformation and control objectives. This resistance is articulated in terms of *'too much paperwork'*, *'just bureaucracy'*, *'managers don't know anything of medical work'*, *'first other systems'*, *'we need more participation'*, *'firstly quality, secondly costs'* and other comparable arguments. It can be expected that these arguments will be expressed by many people when the system is implemented and used by the management.

6 The middle management is urged to collaborate with the implementation of the system. Each meeting gives them homework which brings the implementation nearer. In spite of that, expressions of scepticism among managers of departments and divisions can be observed. A more helpful tool which will provide management information would be welcomed by middle managers, because this is now lacking. But this system will not just provide management information, but also implies a new management philosophy and will demand other working-practices on the workfloor. Some people feel that the implementation of this new concept will have considerable implications for their style of management and that explains a certain degree of ambiguity. Some will welcome such new working practices, but others see also disadvantages. In this context, it is important to emphasise that most departmental managers and some division managers are doctors with -partially-their own practice.

7 The top management feels that it is now time to move to a more tightly managed hospital. The current practice of 'management by budget control' gives the management insufficient means to manage and in that mode there is hardly grip on the efficiency of the hospital. When the Board discovered this system, it was immediately clear to them that this could be an important tool for implementing a new management concept for the future of the hospital. Besides, it should join with

the new decentralised structure, as described in subsection 6.2.3. The top management interprets the failure of the first implementation project mainly because of the low level project people. They believe that a strong project manager, a high top management commitment, enough resources (manpower, finance and facilities) and space for participation will make a success of the implementation. A higher level of management control is perhaps not the only motive for the Board of Directors to urge on implementation. Such a system is -in the Dutch context- novel and innovative, but other large hospitals are also working on the implementation of similar systems. A 'we too' or 'we were first' motive and possibly subsidies as a reward for implementation might be other motives for implementation. Another argument is the 'strategic advantage' argument. Mention is made of the fact that IT is now mainly used for -what is called- operational purposes. Some feel that it is now time to make resources available for strategic use of IT and to use it for managerial purposes.

8   The attitude of staff people is somewhat diffuse and indifferent. Some people of the IS/IM department feel that they are being passed by this implementation project. The MIS project organisation does not use many IS/IM people and only the director is member of an advisory council of the project managers. Some employees of this department stated that they are 'only good enough for the ordinary work' while novel and challenging projects go to other and new departments. The work of many other staff people will not be affected to a high extent by this system and are for this reason not questioned. The MIS is directed towards management information about direct and indirect medical treatments, this means that 'gate divisions' and 'facilitative divisions' (as described in 6.2.3) are particularly involved.

6.7   INTERPRETATION AND DISCUSSION

In this section, this hospital case will be analysed and discussed in the light of the preceding chapters about professionals, professional organisations and information

systems (chapter 2) and information management approaches (chapter 3). This hospital as a professional organisation will be discussed in 6.7.1 and the information systems issues will be discussed in 6.7.2. Subsection 6.7.3 discusses the synthesis between these two approaches and applies some existing models.

6.7.1 The described hospital as a professional organisation

Professional organisations

The case study reveals clearly the tension in this hospital organisation between the autonomous type and the heteronomous type as explained in subsection 2.3.2 (Scott, 1982), which includes the tension between professionals and managers as explained in subsection 2.2.3 (Raelin, 1991, 1992; Gouldner, 1957; Blau and Scott, 1962). This tension can be recognised in many fields such as the strategy ('excellence versus efficiency'), the structure (centralisation versus decentralisation), the culture (managers/administrators versus physicians) and the information systems (MIS/HIS versus local systems).

This becomes more clear because many people mentioned that this hospital is constantly changing along the line which is called in this study the 'autonomy - heteronomy' line. That this change is not unequivocal and is not going in one direction will be worked out more closely in subsection 6.7.2 with respect to the information systems area.

Professionals

Chapter 2.2 discussed the question 'what is a professional?'. According to the attributes approach, a number of characteristics were mentioned with respect to professionals in general (Kerr et al., 1977). These attributes can be recognised in relation to physicians and other professionals such as nurses (probably to a lesser extent) in this hospital. Expertise, commitment, identification and ethics are characteristics of medical

specialists in general, and accordingly, for the doctors in this hospital. The feature of 'autonomy' can also be recognised to a high extent but is constantly an issue of discussion and is changing as explained above.

Subsection 2.2.2 discussed the 'power approach' as an important feature for defining professionals. Applying this approach to these physicians, it may be clear that the medical profession has created a considerable power basis through: 1) the definition of clear medical disciplines (the organisational structure strengthens these disciplines), 2) strong professional associations, directed towards the defense and the improvement of (material) interests and towards the improvement of professional habits and knowledge, and 3) a mutual formal code, guarded by an internal disciplinary court. These results of professionalisation have strengthened the power of the medical discipline and make it hard for the management of hospitals to change certain working practices or to add new insights to the developed methods. One of the objectives of the MIS, as described in section 6.6, is to change certain working practices of professionals. More control, more treatment information to managers and colleagues for discussion and more fixed procedures regarding how to work are indications of change. These changes imply a decrease in the power of professionals in favour of managers. This is partially an explanation for the slow progress and the difficulties which occurred during the implementation of the MIS. Other possible explanations are the technical difficulty, the large number of people who are involved and the lack of experience in managing such projects.

Semantics and politics

The subsection about the culture (6.2.4) explained that various groups can be identified in this hospital, among which were the physicians and the managers as (probably) the most influential groups. An important issue that can be identified in this case, partially through some quotations of managers and physicians, are the different jargons and probably the different goals of these groups. One of them stated explicitly (subsection

6.6.7) that *'staff people speak another language'*.

That 'other language' means -for some of them- another educational background which causes differences in jargon, but it may also imply that these groups are directed towards different objectives and values. If that is the case, it will consequently cause problems when these groups become more involved with each other. It may also explain that it is problematic to develop information systems which similarly support the work of both groups.

This view is in contradiction with the 'order - objective' paradigm in the categorisation of Burell and Morgan (1979, elaborated in section 3.3). Figure 3.18 assumed that professional organisations could be defined in terms which fit with the 'subjective-conflict'-paradigm. This description strengthens that argument. Morgan (1986) uses the metaphor of the organisation as a political arena as an example of the abstract 'subjective - conflict' paradigm.

Change

It is important to emphasise that this metaphor should not be seen as static concept or as a mechanistic model with doctors on one side and managers on the other. The case illustrates clearly that neither doctors nor managers should be seen as homogeneous groups with one immovable group vision. The case gives an image of an organisation in a state of change. Change nearly always involves innovators, early adopters, early and late majorities and laggards and these groups may cross different social groups in organisations. In this case, the change is mainly caused by external pressures (government, customers, insurers, patient interest groups), but also by internal pressures from people who believe that the former situation cannot continue. Some doctors (e.g. doctors 1 and 2 of subsection 6.6.7) adhere to this vision. But this point is not in contrast with the political metaphor. The 'progressive' doctors also assess new developments and systems against the criterion of the extent to which they strengthen

their own interests.

6.7.2 Information systems management in the hospital

The various forces and trends in this hospital are also partially reflected in the current and prospective information systems portfolio.

The hospital information system

The HIS reflects the old structure of isolated medical practices, which are supported by joint staff services. These systems demand a certain level of entry-discipline, but the data are neither used for monitoring or control purposes nor for management information. The HIS is primarily directed towards the operational data streams and even that results in considerable problems (as shown in figure 6.3). A major objection to the HIS is that the benefits flow to administrative operational affairs rather than to the performers of the primary process. The administrative focus implies that most of the modules of this system mean a small move in the direction of heteronomy (see figure 6.10).

PROFESSIONAL

← ←

HETERONOMY ─────────────────┼───────────── AUTONOMY

NON-PROFESSIONAL
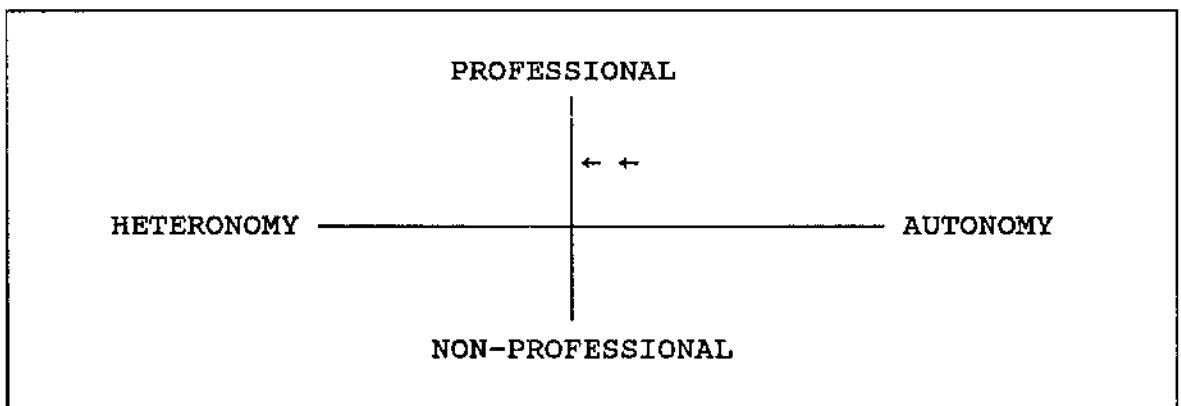
Figure 6.10   Interpretation of the hospital information system

Many physicians experience these modules as *'necessary for the administrators to manage this hospital'*, as one of them said. *'The invoices have to be sent'*. Another

argued that the designers of this system used the operational needs of hospital administrators as their starting point. The information needs of people on the workfloor were given low priority.

The local information systems

Many of the local information systems were designed for the direct support of the primary processes, by those performing them. This is described in section 6.5. These systems aim to help the professionals to do their work in a more effective and efficient way. They are generally tailor-made, which sometimes causes dissatisfaction at other levels of the organisation, because they lack integration or connectivity. The direct support of the professionals involved explains the professionalisation move which is caused by these systems. The impossibility to integrate or to connect these systems explains the increase of autonomy of most of these systems. People are free to build and implement such systems, which can increase the level of professional autonomy at the cost of managerial influence. From a managerial point of view, some of these systems cause disorder and disintegration as shown in section 6.5. The organisational move which is caused by these systems is shown in figure 6.11.
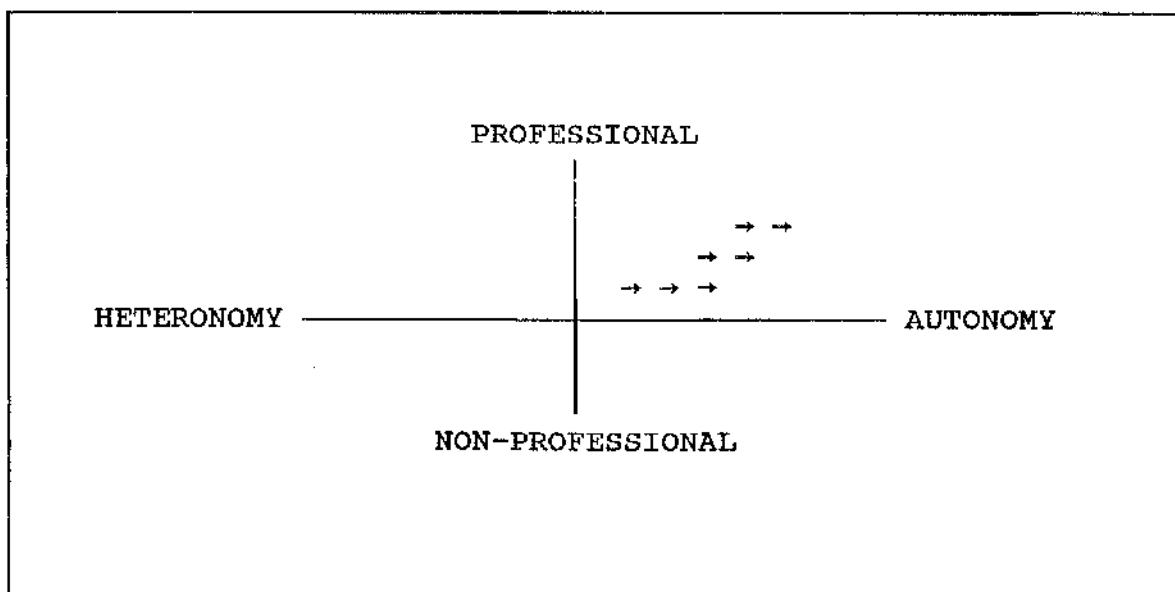
Figure 6.11   Interpretation of the local information systems

The Management Information System

The MIS, as described in section 6.6, aims to integrate the hospital as a whole. It is an organisation wide system, and it demands from the professionals consensus about treatment profiles and candour among the professional group about treatments. Besides, it brings managers and physicians more closely together to discuss financial and medical matters. Until now, managers have focused on financial and administrative matters, while physicians have focused on medical matters. The system has to be used to break through this dual organisation concept and to integrate the various functions to a certain extent. This objective is visualised in figure 6.9.

Successful implementation of the MIS can certainly be interpreted as a heteronomisation move: managers get more grip on the primary process and the level of performance. They can speak to physicians about medical affairs in a factual way: relevant data about treatment patterns can be derived from the system.

One can wonder whether successful implementation of the MIS will also mean a move towards deprofessionalisation. The professional autonomy decreases, which is deprofessionalisation, but some people believe that the professional influence on financial matters may increase. Not only managers, but also professionals, get insight into the costs of their treatments and they can discuss these matters with managers in a way that makes more sense. Until now, they were simply limited by a budget. When their budget was used, they were not allowed to treat more people. Professional insight into financial and administrative matters may give them arguments to change treatment profiles in order to make better use of the limited resources. One can conclude that the MIS is an example of heteronomisation, while it is not completely clear if it means professionalisation (as some people argue, such as the project manager) or deprofessionalisation (as some physicians believe). This is shown in figure 6.12.
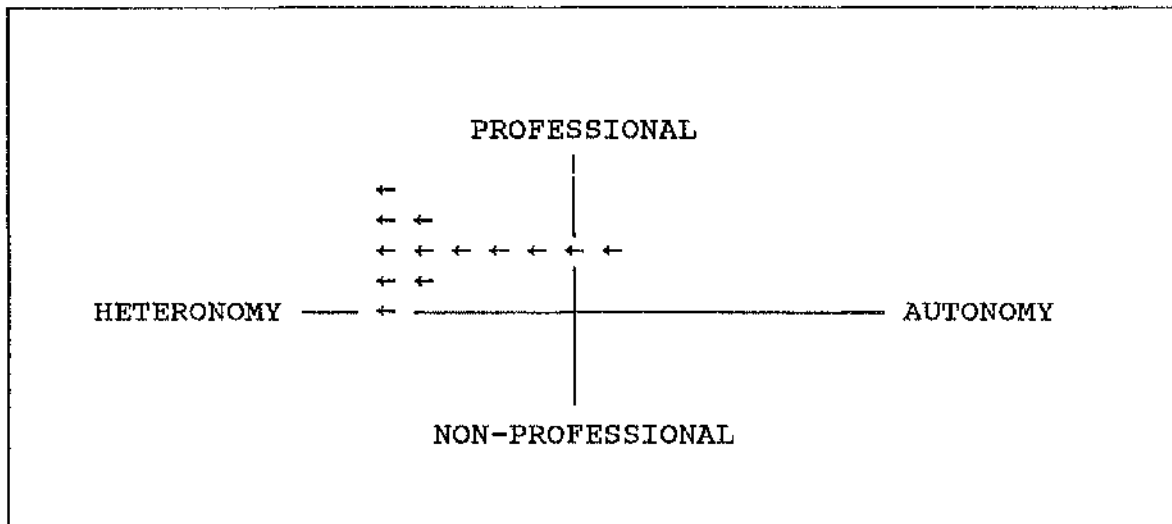
Figure 6.12   Interpretation of the management information system

Reed is sceptical about such systems and perceives them as examples of heteronomisation and deprofessionalisation. Reed (1985):

> 'Perhaps the ideal type of practitioner for the age of non-autonomous physicians will be the protocol-oriented medical automation. As bureaucratic protocols based on cost containment seek to homogenize heterogeneous conditions and events, and the organization penalties for being wrong or not conforming to the uniformity in the system multiply, there will be a devaluation of concepts, such as initiative, innovation, or the utilization of experientially based clinical hunches. Those are autonomous concepts, the absence of which will result in initiates to the profession being imbued with a sense of compliance, not a sense of judgement' (p. 3280).

Conclusion

The three system levels in this hospital (HIS, LIS and MIS) reflect the interests of the various parties in this professional organisation.

The hospital information system is primarily designed to support staff processes, most of the local information systems are primarily designed to support professionals in performing the primary processes, while the management information system is

primarily directed to supporting the management of the hospital. One could say: *'show me the systems and I will show you the organisation'*. The systems portfolio gives an impression of the dispersed power division which is characteristic of this organisation.

This supports the point of view of some authors (e.g. Boonstra, 1991a,b; Hirschheim and Klein, 1989; Keen, 1981; Kraemer et al., 1989; Markus, 1983a; Noble and Newman, 1993), that information systems are means to advance the interests of a certain group or individuals in an organisation, sometimes to the detriment of other groups or individuals. It seems to be difficult to design systems which are simultaneously and equally beneficial for various interest groups. This also explains the problem in getting consensus about the allocation of IS-development resources and the loyalty problems of the IS-organisation. In a professional organisation like this, it might be useful to make the various interests more explicit and to strive towards a balance in system-support, rather than to a uni-directedness of the various systems. In this context, terms like multiform computing and multiform information management may make sense.

The increasing (reciprocal) interdependencies among various parties in the hospital may imply a shifting power balance in the direction of the managerial layers at the cost of professional autonomy. Many professionals will accept such a shift as unavoidable, necessary or interesting, while others will resist. In the long run, increasing interdependencies will mean: more integration of information systems, higher demands on data reliability and availability and an open eye for the various interest groups.   ·

6.7.3 Application of the Kraemer model

The development of computing in this hospital corresponded with the stages approach of Nolan (Nolan, 1979; subsection 3.2.4) to a certain extent. After the initiation stage with some single applications, the use of computers dispersed among various

departments. The control and integration stage was the start of the organisation wide implementation of the HIS-modules which is still going on. The adaptation, implementation and operations of the HIS can be interpreted as typical of the Skill state in Kraemer's terms (Kraemer et al, 1989). Technical sophistication in terms of computer networks and integration got more attention than the utility of the applications for the users. Many users say that it is easier to input this system than to retrieve information from it in appropriate formats. Top management as well as users depended on the expertise of the IS department with respect to operations, implementation policy and technical problems. The top management was not actively involved in implementation and operation matters of these modules. The IS department is the real centre of computing with respect to the use of these modules.

Also characteristic of the Skill state is that conflicts arose with (often powerful) users who did not accept the monopoly of the IS department with respect to computing. The low user directedness of the IS people, the physical and mental distance between users and IS people and the low level of the services (in the eyes of many users) caused irritations, and the origination of local systems.

These local systems can be seen as characteristic of the Service state. These systems do not cause many problems in terms of complaints, they are appreciated by the end users, the user departments decide about design, implementation and user and they are close to the primary process. They cause problems for the top management and IS management in terms of (lack of) integration and (in)connectivity and the efficiency of the systems are perceived to be low.

The development to these two states: a high level of integrated systems (Skill) *and* many local systems (Service) can be explained by the nature of a hospital. Division of labour in hospitals (doctors in various specialisms, kitchen, nursing, administration, laboratories etc) leads to a high need of data exchange and data-availability. That

demands systems integration which often has to be managed by a central IS department. That explains the Skill state. On the other hand highly skilled people perform the primary process of the organisation. They have specific -tailor made-information needs. Besides, they are able to meet these needs by building their own systems because of their high level of education and their autonomous attitude as professional. This is a Service state force.

Increasing consciousness of the top management with respect to the opportunities of IT and the problems with the use of computerised information systems (as described) resulted in more attention of general managers at the top level. This led some top managers to believe that new information systems could help them to get the information they needed to manage the hospital in a better way. This awareness led to the purchase of the MIS (described in section 6.6), which had to be connected with the HIS. This strengthens the importance of a sound HIS and introduces a new state: the Strategic. It is clear that this initiative disturbs the balance between the local systems and the HIS systems. Many users of local systems perceive this development as threatening and as an attempt to lessen their influence. Successful implementation of the MIS should be a move in the direction of the Strategic state in Kraemer's terms (ibid.). The implementation of this system demands much time and attention from the top management, pushes the IS management to a certain extent aside and perceives the purely local information needs as secondary to the organisation wide organisational concept.

This development of information systems illustrates that it is not possible to categorise computing in this organisation in one of Kraemer's boxes. New systems (such as the management information system or certain local information systems) do not replace the original hospital information system. Figure 6.13 illustrates this development.
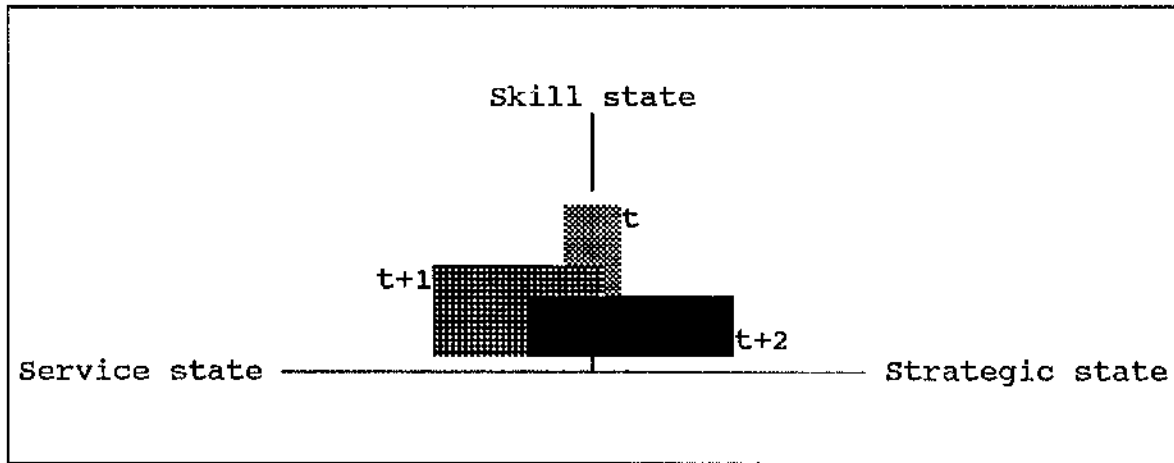
Figure 6.13   Transforming states of computing according to the Kraemer model (Kraemer et al., 1989)

The hospital started to use operational systems under the authority of the IS department. That situation is characterised in figure 6.13 as 't'. As a reaction to that *technocratic elitism* (in Kraemer's terms, ibid.), the professionals and the department heads developed local systems which caused a situation which is near the Service state ('t+1' in figure 6.13). Increasing awareness of the top management in strategic use of IT, increasing external pressures and other incentives were reasons to move to the Strategic state ('t+2' in figure 6.13). New states did not replace the old arrangements completely but added new systems to the old ones. For that reason, the states in figure 6.13 are overlapping instead of disjunctive.

CHAPTER 7
CASE HOSPITAL 2

7.1 INTRODUCTION

The second case study focuses on a smaller hospital than the first one. This hospital is medium sized and has a major function in the provision of health care in a specific part of the country. Most of the physicians in this hospital have a different formal position than the physicians in hospital 1, which leads consequently to different authority relations with the hospital management. These in turn have an impact on the information systems policy in this hospital, which will be illustrated in this case study.

The physicians are organised in partnerships, around certain medical specialisms or groups of specialisms. These partnerships are autonomous companies situated at a certain location within the hospital. The income of the individual physicians depends on the kind and number of treatments which they perform within their partnership. Because of this, they do not receive a salary from the hospital. In spite of this autonomous legal and economic position, the physicians are highly dependent on the hospital (because of the common use of facilities, the people who assist, the nursing staff etc.) and the hospital depends on the physicians from various perspectives. This mutual dependency explains the necessity to use common data and consequently common information systems. But because of the position of autonomous partnerships, those partnerships (also) follow their own information systems policy, which does not necessarily coincide with the hospital policy. This case study describes a part of this coherence. Referring to chapter 2, the professionals in this hospital differ from those in hospital 1 with respect to their autonomy, caused by economic as well as legal reasons. This autonomy provides these physicians with more power than their colleagues in academic hospitals, which leads to more influence in various organisational

arrangements with respect to physicians.

Hospital 1, as described in chapter 6, moves from an accent on the Skill state, via the Service state to stronger Strategic state characteristics. In contrast to that case, this hospital shows an information systems state where the IS department and the professionals are competing and bargaining with respect to the IS arrangements. Through a number of factors, among which the different legal and economic position can be mentioned, hospital 2 has different IS/IT arrangements from the first hospital.

As in the first case description, the main questions which this case study attempts to answer are:

- what is the organisational context of the use of information systems in this hospital?

- which systems and kinds of systems are used, and how is use of these systems managed? Which interests are served by these systems and how are the system decisions made?

- how do the professionals in this hospital use systems and how are they affected by certain hospital systems?

Section 7.2 describes this hospital in general, while section 7.3 focuses on the IS organisation: the structure of the IS function, decision making with respect to information systems and the information systems infrastructure. After this general description, the fourth section focuses on one specific IS project: the implementation of an outpatients' appointments system. This description illustrates the specific characteristics of dealing with IT/IS in a hospital like this. Finally, section 7.5 analyses the practice with respect to information systems in this hospital in the light of the preceding chapters.

The Kraemer model (see also section 3.4.1) as well as the Professional-Heteronomy model (section 2.4.4) will be used to describe and analyse computing in this hospital. The strong formal position of the partnerships of physicians can be seen as a reinforcement of Service state characteristics in this context. Physicians are not

prepared to collaborate with company wide system initiatives. With respect to new systems which affect the working practices of partnerships, only a partnership-by-partnership approach to system implementation seems to work satisfactorily. On the other hand the IS department is a powerful agency with a relatively high amount of authority and resources and is legitimised by the top management.

In view of this, computing in this hospital can be explained to a large extent by a bargaining process between IS department and the heterogeneous partnerships of physicians. Top management views computing to a certain extent as a support function which can be delegated to the IS department. Awareness of the strategic impact of information systems is not high, but is slowly increasing; this can be seen as an important difference from the management of hospital 1.

Various sources are used to collect the necessary information to draw up this case study. Semi-structured interviews with line managers, IS people, secretaries, staff people and physicians were important for gaining an impression of the views of these people on computing. The most important subjects of these conversations were the existing systems, the IS policy, the plans for new systems and the influence of systems on patients and on the daily work of employees. Studies of students who had placements in this hospital were valuable for gaining an accurate impression of how things worked. Three students helped to implement the appointments system which will be described in section 7.4. Their reports and tapes of discussions of this project were important sources of information. Nurse students who had placements in nursing departments could give information about systems use from a different perspective. Besides, many documents, such as reports of meetings, policy plans and manuals were helpful for gaining thorough insight into the IS practice of this organisation. As in the first case study, some people requested anonymity in return for the exchange of information.

7.2 THE HOSPITAL ORGANISATION

In order to give an impression of the context of the use of information systems in this hospital, this section describes some organisational characteristics of this hospital.

7.2.1 General

Hospital 2 is a medium sized hospital in the Netherlands. It originated from the merger of two other hospitals and some nursing homes at the beginning of the eighties. It has one major location and a few minor locations. The hospital has the strategic objective *'to have a major function in health care in this part of the country and to supply a patient-friendly kind of health care'*. It has about 2200 employees, about 175 physicians, 1100 beds and revenues of *f* 230 million.

7.2.2 Strategy

The strategy as formulated in the strategic plan of the hospital emphasises various objectives, including:

- the strengthening the position of the hospital as the major provider of high quality health care in the region;
- to meet the expectations of patients and their relatives with respect to the quality of cure and care as well as the so called patient friendliness: good facilities, high level of availability of facilities and a personal approach to people;
- to optimise the use of people and facilities in order to control the costs and to improve the effectiveness of the organisation;
- to decentralise the decision making authority to the lowest possible levels in order to strengthen commitment of employees and to manage the increasing size.

An interesting aspect is that reports such as the Strategic plan show to a certain extent an ambiguous style. Sometimes 'the board of directors *and* the medical staff' are

written about as being two different authorities which conjointly determine how the hospital works and whose decisions are taken as a recognition of being a real dual organisation. In other situations, the style suggests a uniform decision unit, like *'The board has decided that'*. It is not always clear whether the partnerships of physicians come under the jurisdiction of such decisions. This aspect will be explained in more detail in section 7.2.4.

A difference with respect to the formulated strategy of hospital 1 is that it articulates in more detail the striving towards excellence and towards increased managerial control of medical processes. These objectives and that level of concreteness cannot be found in the strategic objectives of this hospital.

7.2.3 Structure

Figure 7.1 shows the structure of this hospital. The three directors cover the general, financial and patient areas, which are divided in various departments. These departments each have a department head. The supervising body appoints the members of the board of directors and has to intervene if conflicts arise. The board of directors has the final responsibility for the functioning of the organisation.

In contrast with hospital 1, this structure can be characterised as a functional organisation. The various departments perform a certain specialised function within the total number of tasks of the hospital. This leads consequently to a high level of interdependency among the various functional departments.
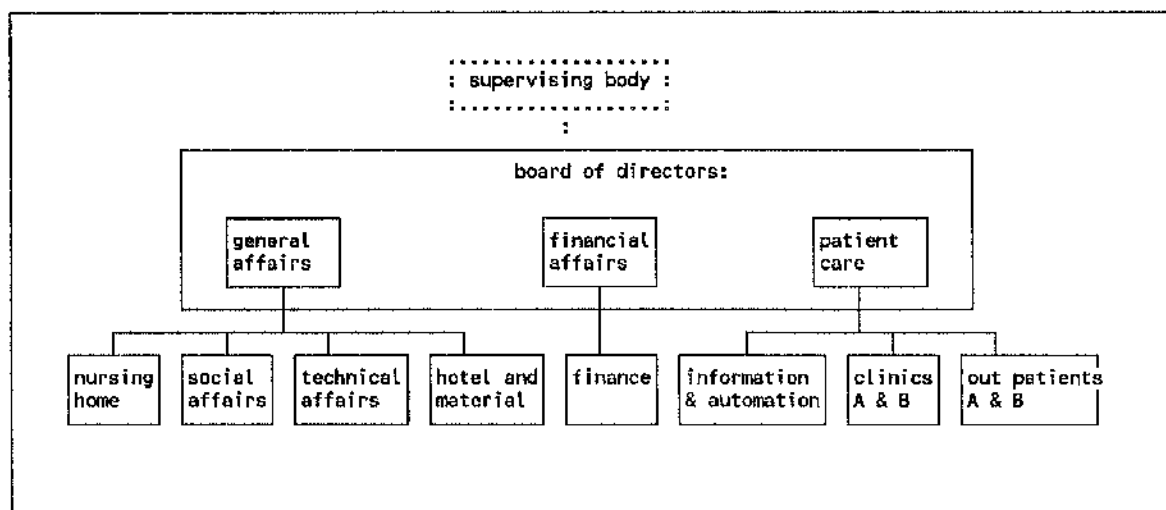
Figure 7.1   *Global organisation chart of hospital 2*

The position of the physicians differs from hospital 1 because the physicians in this hospital do not have an employment contract with the hospital but have their own private partnerships within the hospital. For this reason, they are not incorporated in the organisation chart of figure 7.1 (and 7.2). Figure 7.9 indicates the position of physicians within this organisation. This aspect will be discussed further in section 7.2.4.

Problems with the management of interdependencies (through the increasing size of the hospital) are the major reasons for the management to change this structure into a more product oriented organisational structure. In that proposed structure there are four core clusters of medical specialisms which are supported by two facilitative clusters: the medical cluster and the cluster for hotel and technical functions. This supposed structure is shown in figure 7.2. These clusters have to be as autonomous as possible; the cluster managers will have their own responsibilities, their own budget and their own functional units. The board perceives the 'financial responsibility of the prospective cluster managers and 'insight into costs and control issues' as essential, according to the policy plan.
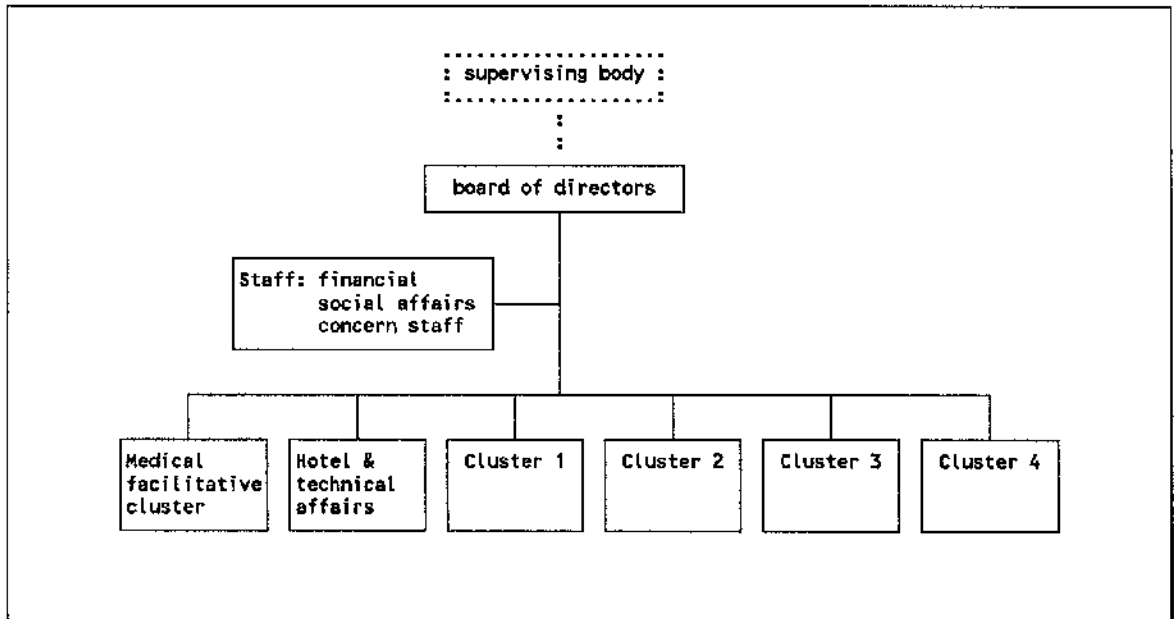
Figure 7.2   *Proposed (new) organisation chart of hospital 2*

The hospital management has the objective to involve the physicians more in managerial issues, certainly in the new structure. The cluster managers have to agree on the patients policy, the investments budget, the quality policy and the spending of the budget with the physicians and the department heads. These new 'general middle managers' will become a new phenomenon in this organisation. Whether it will become successful cannot be predicted, but various interviewees said they expected fierce power battles between cluster managers and partnerships of physicians concerning the allocation of facilities. The lower position in the organisation and consequently the lower status of these new functionaries will make this a difficult task. How the top management deals with such conflicts is said to be crucial: will they back the middle managers or will they follow a middle line and so weaken their position?

A central idea behind the restructuring process is that jointly the physicians should become more responsible for the policy of the hospital as a whole instead of being only responsible for their own partnership. This management participation policy is an

issue of debate (not only in this hospital). Some people argue that it is not rational to ask physicians to participate in the management of a hospital if they do not have employment contracts with that hospital: their real loyalty lies elsewhere, namely in the business interests of their own partnership. Others say that management participation of physicians is the way to involve them in other matters than those of their own business. Experiences of many hospitals indicate that the readiness of physicians to spend time and attention on organisational affairs of the hospital organisation is generally not high. For this reason, some people ask for specific payments to motivate representatives of physicians to increase their participation in managerial decision making of hospitals. Others argue that a clear separation of tasks should be better - *'Managers should manage and physicians should cure'* (Fahrenfort, 1994, p. 18). Some physicians admitted that the participation in management affairs does not increase the prestige of such physicians within their professional group. *'It is often the weaker brothers who flee in such tasks'*, one of them said. This corresponds with Dawson (1994) who argued:

> 'The requirement for clinicians to engage directly in strategic and operational management, was often viewed with considerable suspicion and antagonism. Some saw it as yet another demonstration that politicians did not appreciate either the true value of clinical work, or how hard the clinicians were already working' 'Another interpretation, which engendered an equal amount of suspicion, was that the changes were a ploy by managers to lighten the managers' load or somehow to co-opt or entice clinicians across the boundaries of professional and managerial work' (p. 11).

In spite of these interpretations of the involvement of clinicians in hospital management, many hospitals follow a policy which is directed to more consensus, management participation of physicians and integration, as shown in figure 5.4.

7.2.4   Professionals: independent partnerships of physicians and the consequences

The hospital houses about 30 independent partnerships, which use the facilities of the hospital in order to carry out their 'business activities'. Most of the physicians call this their provision of cure and care. Fewer than 10 physicians are employees of the hospital. The freely settled physicians do not have a fixed salary but their salaries depend on the number of medical treatments which they perform and the agreed prices of those treatments which are prescribed by the National Board of Medical Tariffs.

The physicians and the partnerships therefore have both clinical *and* business roles. The business roles are primarily directed to the advancement of the interests of their particular partnership. Because the partnerships are small (3 - 10 physicians and some secretaries), they are managed in an informal way. Each physician has his/her own patients and the various physicians of the same partnerships stand in for each other during absence. Partners all have an equal position and official chairmen, heads or similar positions are not observed. Only temporary positions, often called convenors, occur within the partnerships.

Most of the physicians perceive the hospital organisation and the people who support them personally as facilitators and background functionaries. As one said:

> *'People are sent on to me by family doctors. I decide what has to be done, like laboratory tests, admission, surgery or whatever. Through that decision I commission other people to do certain tasks. That continues until I decide that the treatment can be stopped and the patient can be dismissed. From that point of view, we as physicians are the main decision makers of the hospital.'*

This illustrates one of the problems for people like nurses and laboratory staff. On the one hand they have a functional manager as a head, while they also have to follow the commands of the physicians. Ultimately, the physicians are responsible for the proper treatment of patients. This dual command can be seen as a major intrinsic problem in

hospitals such as this one.

7.3 THE IS FUNCTION

Section 7.3 describes the IS organisation and infrastructure of this hospital in a global way. Subsection 7.3.1 describes the position of the IS function in this hospital and subsection 7.3.2 goes into the decision making with respect to computing. Subsection 7.3.3 describes the kinds of systems which are used and the plans which are made with respect to the use of systems in the future.

7.3.1 Structure and tasks of the IS function

The IS department of this hospital was founded in 1990. Before 1990, the hospital used external computer services, mainly for the financial systems such as invoicing and pay roll. The use of external computer services was an inheritance of the practice in the different hospitals which merged into this.

The service was based on a central data processing office in the middle of the country. By means of data communication, they sent their -often financial- data and they received the print outs the next day. Because of the limited flexibility of this operating procedure, the management decided in 1989 to found its own IS department which was given the task to adapt, to tune, to implement and to manage an integrated hospital information system.

This integrated hospital information system is set up as a number of modules which are developed by a foundation of various member-hospitals in the Netherlands. The modules can be selected, implemented and linked through one hospital database. The basic characteristics of these modules are similar to those of hospital 1, as described in section 6.4., but hospitals are free to adapt systems and to implement them in a way

which meets the specific requirements of that particular hospital. In spite of that, section 6.4 gives an accurate impression of the characteristics of this system, with regard to hospital 2.

One important difference between hospital 1 and 2 with respect to this HIS is the aspect of data reliability. As mentioned in section 6.4: 'doctors and secretaries do not always have clear benefits from a conscious update of the system. The benefits are usually for the hospital in general (e.g. cash from invoices)'. But in hospital 2 there is a clear interest in the proper recording of treatments because physicians depend financially on this record. This explains fewer doubts regarding the data reliability of these registrations.

Local system initiatives of certain partnerships which do not align with the integrated system are not supported by the IS department. It is a conscious policy to isolate such information systems and computer networks from the corporate system. Technical connections between these systems are forbidden and the IS department does not help these partnerships with problems. The management believes that such a policy will urge partnerships to change their IS policy and to use the corporate system. The IS manager stated in this context:

> *'if a partnership wants to manage its own IS affairs, then the partners are free to do so at their own costs.'   'They are fully responsible for such systems.'   'Seven partnerships have decided not to collaborate with the implementation of our systems and follow their own IS strategy.'   'Other partnerships use certain hospital wide systems but are very anxious to implement new modules within their partnership.'*

The major reason why the management does not support local systems is that they believe that it is not possible to link these systems to the large hospital database if that should be relevant. The IS manager stated about this:

> *'during the start it will succeed in connecting systems, but as time progresses, it becomes more and more difficult to guarantee such connections. The various suppliers of such systems will not pay the costs of linkages among systems, so the hospital has to realise this technically and to pay the price for this.'*

The final systems objective of the IS department is to link all the essential data of the clinics, the polyclinics, the nursing departments, the pharmacy, the laboratory and the finance department in one database in order to support the operational information interchange. As the IS manager said:

> *'We promote our systems and they become more and more dispersed. We start with the partnerships which are well-disposed towards these systems and by offering customer directed support and free facilities, we try to make others enthusiastic too'*

> *'An example of our customer directedness is our instructions. Secretaries, who are employees of the partnerships and not of the hospital, can get instructions about new systems during the evening hours instead of by day. Physicians appreciate that because otherwise they would have had to look for other secretaries during such instructions.'*

This policy can be characterised as typical of the Skill state. It is directed to the use of operational integrated systems. Many of these systems are not primarily directed to support the work of physicians or nurses, but to make functions like planning, invoicing and control possible and efficient. The influence and the interests of departments towards computing is relatively low and the IS department is primarily the initiator and promoter of new applications. The top management and the medical departments have a more passive role. The last two quotations refer to a 'selling' style of the IS department. They try to sell their ideas to other -less interested- parties and they try to win them by attractive arrangements such as instructions during evening hours. This illustrates a relatively low interest among those other parties. It suggests that they only collaborate if the costs can be minimised. The IS management takes the full responsibility of computing and markets their vision to the users and the top management.

The IS department has approximately 10 employees: a department head, some application operators, some general employees (who work on implementation projects) and a secretary. The hospital uses a terminal network with approximately 300 terminals linked with some mini computers. The IS department is reserved to link personal computers with the hospital network. They are afraid that such personal computers will

disturb the day to day operations and that they will promote local systems which are said to be unconnectable with the company system. IS people mentioned also 'costs' as an important reason for the absence of personal computers: *'terminals are still cheaper'*.

This policy to avoid personal computers can also be perceived as characteristic of the Skill state. The dominant party (the IS department) decides that other parties should not use computers to support their work in an uncontrolled way. Kreamer calls this *'technocratic elitism'* (Kraemer et al., 1989). The IS department sells its vision, helps people to join the system and to share the vision but stops any support when the central IS policy is not followed. Mixed demands, multiple directions and certain isolated systems were said to be *'starting points of chaos'*.

A physician of a non-collaborating partnership argued that the primary problem of the hospital wide modules is that they are not really directed to the way they work:

> *'Such systems are general packages for the hospitals in the whole country and besides, they are primarily directed towards administrative purposes. We bought a package from an association which developed information systems specifically for partnerships of physicians, and that package is much more directed to our needs. We are not considering replacing that system.'*

He believes that the IS department should support the activities of the partnerships without prior conditions:

> *'We do not understand why our choice is not accepted by the hospital. We think that the data can easily be transmitted to the hospital system. Ultimately we believe that systems should support our work; we select systems primarily on that criterion'*

> *'We would like it if the IS department should give us some service to keep up our system in a responsible manner, but they are not willing to do so. Because of that, we do it ourselves in our way.'*

Such specific support packages for physicians are often recording systems which work in a user friendly way with the use of a graphical user interface, pop up menus, use of colour monitors and use of devices like a mouse or a trackball. They help physicians to

record their treatments properly in a sequence which is in accordance with the professional work sequence of physicians. These systems use the working procedures of physicians primarily as the starting point of system design, rather than the integrated information infrastructure of the hospital. This problem can be interpreted as the tension between the Skill/Strategic state and Service state demands. The crucial question in this perspective is: *what is the first and main objective of a system? To support the primary process or to support facilitative or managerial processes?* Certain physicians argue that most systems are primarily designed to support such facilitative processes rather the work of the physicians themselves.

Increasing use of such local partnership systems should clearly be a development towards the Service state (ibid.). Departments and individual professionals determine which systems are used, which leads to pluralism. Such a pluralism should lead to a lower influence of the IS department and the top management. At this moment, such systems are not widely used; many physicians rely on manual medical dossiers.

The position of the IS department will change after the restructuring of the organisation (section 7.2.2). The IS-function will be incorporated in the 'Medical and Facilitative Cluster'. It is the intention that the various cluster managers purchase IS services from the facilitative cluster and pay for it but it is unclear if and when that procedure will be implemented. Besides, it can be questioned if it will influence the relation between physicians and management except that certain tasks of the top management will be carried out by the cluster management.

7.3.2 Decision making with respect to the implementation of information systems

The IS policy is formally determined by the IS policy group. This group consists of the directors of financial affairs and patients care, the head of the IS department and a representative of the medical staff. This group has meetings four times per year for

evaluation and planning. Besides, they monitor the progress of actual system implementation projects. These meetings are prepared by the head of the IS department; he is responsible for the development and the drafting of plans and reports on the progress of implementation. Specific working groups accompany the implementation of specific systems. This structure is shown in figure 7.3.

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                    ┌─────────────────────┐
                    │    Policy group     │
                    └─────────────────────┘
                              │
         ┌──────┬──────┬──────┴──────┬──────┐
┌────────────────────────────────────────────────┐
│ Various temporary project groups which          │
│ accompany various implementation projects       │
└────────────────────────────────────────────────┘
              │         │          │
     ┌────────┴───┬─────┴────┬─────┘
┌──────────────────────────────────────────────┐
│ If necessary: temporary working groups        │
└──────────────────────────────────────────────┘
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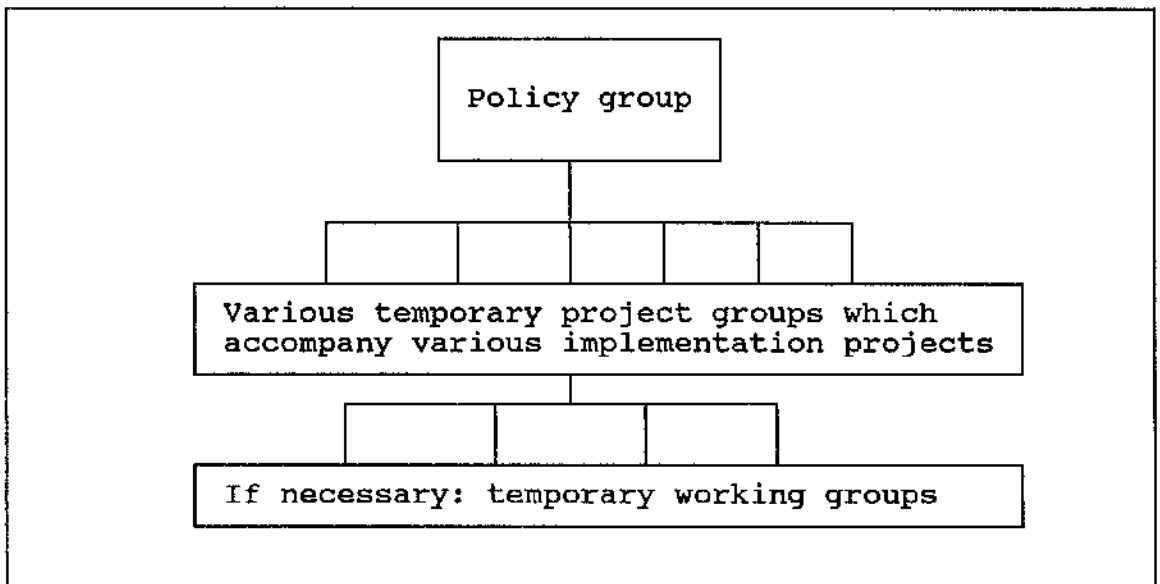
Figure 7.3   *Decision making structure with respect to information systems*

This structure of decision making with respect to the implementation of information systems is strongly based on the idea of centralised consensus decision making. Centralised, because this group discusses and decides about the IS policy for the hospital as a whole. This implies the implementation of hospital wide integrated modules. Consensus, because the heads of the affected departments discuss IS-matters with the top management and with the IS people in order to gain agreement about the plans for the future. Only system proposals on which agreement is reached by the involved parties will be worked out and implemented. But it has to be said that the IS specialists in this field are most influential because of their knowledge and expertise. In practice, they determine the agenda, they confront proposals from others with the

technical (im)possibilities and they regularly have a strongly argued opinion about the priorities which should be set.

The representative of the medical staff has a specific position in the policy group because that person speaks only on his own behalf. He does not have a mandate from his fellow physicians to agree on certain plans and it is not possible to get such a mandate. Plans which affect individual physicians or partnerships of physicians have to be negotiated with those physicians. The representative of the doctors in the policy group can be perceived as an attempt to involve this group at an early stage. That the representative does not have a mandate is perceived by the other members of the policy group is highly impractical. It delays to a high extent the speed at which decisions are made. But the various partnerships see themselves as autonomous and do not want to hand over any decision-authority to others. It is also seen by the physicians as a protection against erosion of influence. In the current situation, it is not possible for the other members of the policy group to put the representative under pressure and to force decisions because partnerships are never committed to such decisions.

After the policy group has agreed the plans, they have to be carried out. That process is perceived by the management (i.e.: top management, IS-manager and departmental managers) as a negotiations process with the various partnerships. As mentioned, it is necessary to agree the plans with each affected partnership; the joint board of partnerships does not have the decision power to agree with the top management about such issues. The IS manager states in this context:

> *'The basic approach is according to a plan containing concrete objectives to introduce certain systems but the daily practice is one of negotiations. It takes a lot of efforts to make the partnerships participate in the implementation of systems in their practices. They are always asking for the benefits for their partnership, while certain benefits are particularly at other parts of the organisation.'*

> *'The plan is static and the practice is dynamic. In my budget 100 extra terminals were planned but in the meantime, the Board proposed "..to drop 140 terminals on the desks of the doctors.." if they collaborate with that in order to get a foot in the door.'*

Because of the structure with independent partnerships, physicians ask for concrete benefits for their partnership, and act specifically from the perspective of the partnership interest. The hospital management cannot oblige them to participate. The general management and the IS management try to work with incentives and negotiations to make partnerships willing to cooperate. The IS manager states:

> *'at the moment that the typewriter collapses, I say, "You can get a wordprocessor and we pay that, but only if you are willing to record your patient information in the Hospital Information System and if you allow us to implement the appointments system in your practice within a reasonable time limit". In other words: we get something, they get something.'*

This quotation is an example of negotiations about the implementation and use of information systems. Such negotiations are characterised by rewards (*'if you allow us to do this, you get that'*) and by sanctions (*'if you do not allow us to implement this system, you do not get access to these data'*). Only physicians who update the system become authorised to retrieve certain specified data of the system. This policy can be characterised as Skill state like. The vision of the IS department is sold to others by various means of promotion like rewards, threats and sanctions. The possible question of the IS department 'what can we do for you?' has hardly been asked. The IS manager believes that meeting the demands which are expressed after such questions will certainly lead to disintegration.

Such an IS-relationship develops with each partnership. Through the recognition of mutual interests and mutual trust, the hospital information modules become increasingly implemented. However, there are still five partnerships which use their own systems which are not connected with the organisational system. As a result of this, these physicians do not have access to the data of this system. Other partnerships use certain systems (e.g. word processing applications and patient files) but refuse to implement other modules, e.g. the appointments system. The IS manager said:

> *'It takes so extremely much time to make some progress. Each partnership has to agree on the conditions and partnerships have the competence to say 'no'. Because of this, there are systems in a continuous state of partial implementation. I believe*

that we will one day reach the final objective of system integration and homogeneity of working procedures but it will take a lot of time and efforts.'

The role of the formal position of the physicians (employment contract versus independent partnership) can be interpreted from the perspective of Kraemer's model. Independent partnerships give much space to physicians and may lead earlier to a Service state if they organise their own systems support. Employment contracts will place the physicians in the normal hospital hierarchy, which would make it easier to urge them to cooperate with implementation projects. The management information system of hospital 1 (section 6.6) is an example of a system which is only possible in a setting with physicians as employees. That system demands cooperation with standardisation activities of physicians. Physicians in partnerships could simply say to the implementers: 'that is not your business'

Many people believe that employment contracts with individual physicians and the abolition of the partnership as an autonomous private company will smooth the way for the management to follow a real corporate IS policy. Others argue that such a formal and legal change would smooth the way formally, but that it would not change the (micro) attitude of many physicians and their expert power.

A problem in this context is that most physicians are not really interested in what they call 'organisational issues'. Most physicians want to treat people and want to advance their work rather than discussing changes in the organisation. On the other hand, they do not accept that other people (managers) take the organisational decisions which affect them without discussing that with them. A staff employee stated about this problem:

> *'Physicians do not attend meetings or they arrive too late. When they arrive, they have not prepared the documents. Sometimes, they open the envelop with information about the meeting after arriving at the meeting. They always have a weakly argued opinion, but they cannot be talked out of that. They only speak for themselves, never for their partnerships or for the physicians as a group. They only want to regulate things in such a way that it hinders their work in a minimised way.*

It does not interest them what that means for other people. Other people, like nurses and staff people have to adapt themselves to them, not vice versa.'

The perspective of many physicians on these problems is different. Many of them experience tasks other than treating people as loss of time and they think that such things have to be minimised. Problems have to be solved quickly; that is the working practice within most of the partnerships and that is the way the hospital should be managed according to their opinion.

These conflicting perspectives are also apparent during information systems projects. The implementers experience problems in the interchange of opinions about how the system should be implemented. One of them said that many physicians are used to giving short (often multi interpretable) commands about specifications and they are not often prepared to discuss that extensively with non physicians.

These contrasting views also characterise a clash of different cultures and backgrounds: administrative versus professional. This aspect is discussed earlier in subsection 2.2.3.

7.3.3 Information systems

The most important data in hospitals are concerned with patients. This hospital has the long range objective to record all the patient-related data in the integrated patients system and to authorise employees to get access to parts of these data. Most non-medical data about patients are already recorded in that system and many physicians let their secretaries update the system with treatment data.

Treatment registrations

A proper registration with respect to treatments is important for physicians, because their income depends on a proper registration of those treatments in the system. The finance department has access to the system and sends the invoices to the health insurance funds or to the treated people. A consequence of the structure of

independent partnerships is that many treatments result in various invoices: one from the hospital (with respect to the use of facilities and people) and some from the physicians involved (with respect to the offered services, like radiology, anaesthesia and surgery).

One can ask whether a change from independent partnerships to employment contracts (as suggested, see section 5.5) will lessen the directedness of the physicians to a proper registration of treatments. Section 6.4 describes some problems of hospital 1 with respect to this issue. Specific for the partnership structure is that physicians have their own business interests which means that they are also directed to financial and business aspects of their work. Some people argue that employment contracts may cause disinterest in that dimension of the organisation and will just strengthen their professional focus.

It is not yet possible to record all the medical data in the Hospital Information System because certain information such as X-rays cannot be processed by this system. A manual archive is still needed to record such data and other relevant hand-written information. Specific archiving systems are used in order to register which people borrowed these non computerised patient files.

Separate patient registrations

Because of the fact that not all the partnerships want to use the company wide system (as described in subsection 7.3.1), there are complete separate registrations about patients. Another aspect is that many physicians have their own hand-written file about patients, while their secretaries update the formal system. Many doctors feel that the system is designed for non medical registrations: finance, invoice, Nation Medical Registrations, budget information, statistics etc. Their own -often paper based- system is said to be more directed to their own professional needs. A physician said about this:

> *'these modules are primarily designed for staff people. We cannot use it, it is easy to enter certain limited data, but nearly impossible to retrieve information at the moment you need it. The direction and the perspective of these systems are wrong.'*

This dissatisfaction of many physicians with this system can be interpreted as a typical problem of the Skill state and the various local (often manual) databases as a tendency to the Service state. The integrated system is implemented by the IS department and this department has the responsibility to maintain and adapt the system. The board has articulated the objective that more physicians will use the system for their own work: for sending release letters about patients to their family doctors, for retrieving information about former treatments and to record the data about treatments. A member of the board said about this:

> *'we believe that many doctors feel hesitation to use such systems and ask their secretaries to update the various files. We believe that when some of them are going to use it, enthusiasm will come and even the traditionalists will make use of it.'*

This opinion is based on the assumption that these systems are helpful for anyone and that non use is based on vague fears, traditionalism and lack of experience. Such irrational factors could be overcome by means such as training, persuasive force and the example of colleagues according to this vision. In Markus' terms (as set out in subsection 3.4.2., Markus, 1983a), this is assumed to be a kind of resistance which is people determined. The possibility of a system determined or an interaction determined kind of resistance is not extensively considered by the IS management or the top management. When these kinds of resistance are the deeper reasons for the low level of use by physicians, different implementation and adaption strategies should be chosen in order to grow to a successful and widely adopted use of systems.

In this light it is worth mentioning that there is research about the possible implications of a computer on the doctor's desk on doctor-patient communication. Much research on this theme suggests that it is likely that IT affects that relationship and that the kind of influence depends on the way that IT is developed and applied (Fitter, 1987; Pringle, 1985; Tate, 1983). Systems may impose a structure on the consultation process and incorporate medical protocols. Some people argue that such directive systems are

at the expense of discussing other topics with the patient. In such cases, the computer tends to focus the consultation (Brownbridge et al., 1984) which may or may not be appropriate. Technically, it is of course also possible to provide a blank screen, which makes unconstrained record keeping possible but this should make retrieval or analysis difficult. The imposition of a predetermined structure can affect the clinical freedom and may consequently have deprofessionalising effects. From this point of view, hesitations are understandable.

Waiting lists

An irritation of the management is the issue of waiting lists. With regard to many treatments, waiting lists are needed. An integral waiting lists system as a part of the integral hospital information system is used to manage this list. This system is aimed to be used as a support tool for the hospital planning function.

The management feels that they have the primary right to manage that list and to make appointments with people on that list when there is space. That decision will be influenced by the capacity of the hospital: the availability of equipment, budget, rooms and people. A departmental manager said:

> *'in the ideal situation we will schedule each day the facilities and the nursing personnel in the scheduling system. They can be seen as the supply side of care. Besides, we measure the demand for care of each patient. By mixing both we have insight into care supply and care demand and in the overcapacity or undercapacity of care supply. Based on that insight, we can decide to accept a number of patients of a certain kind.'*

But in contrast with this, many physicians feel that they have the primary right to manage the waiting list with respect to their specialism and they have consequently their own waiting list, which is independent from the hospital's list. They use that list because they feel that they have their own medical (professional), business and private priorities. A manager said in this context:

> *'We must stop with all those elective waiting lists. It is unacceptable that a physician can decide that the capacity of an operating room will be used for one hip operation instead of for six blind gut operations.'* *'We must tune that with*

capacities of personnel, with the budget, with the nursing capacity, with the available beds etc.'

Physicians claim that it is an element of their professional autonomy to make primarily medical considerations about the acceptance and prioritisation of patients. They argue that only they can decide which decision is most responsible from a medical point of view. It is not exceptional that the hospital planning is thwarted by a medical urgency of a physician.

This waiting list dilemma can be perceived as a typical professional - management conflict (as set out in subsection 2.2.3), which is enforced by the specific business interests of the professionals involved. This dilemma becomes more evident through the use of systems from both sides, which makes the whole problem more visible and urgent. It is the ultimate result of an organisation with dual lines of authority. Many partnerships of physicians use their waiting list system with respect to their particular patients and the hospital uses a more general waiting lists system. Through this situation, it is not possible to ask for a particular patient without tuning that with two different systems.

Within the Professional-Heteronomy model, the hospital waiting list system can be seen as an attempt to move towards heteronomy, while the various partnership systems are emphasising the autonomy of partnerships and individual physicians to decide about admission. Figure 7.4 shows this dilemma.

PROFESSIONAL

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hospital  ← ← ←      → → → partnership
  system  ← ← ←      → → → systems
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HETERONOMY ◄─────────────────────► AUTONOMY

NON-PROFESSIONAL
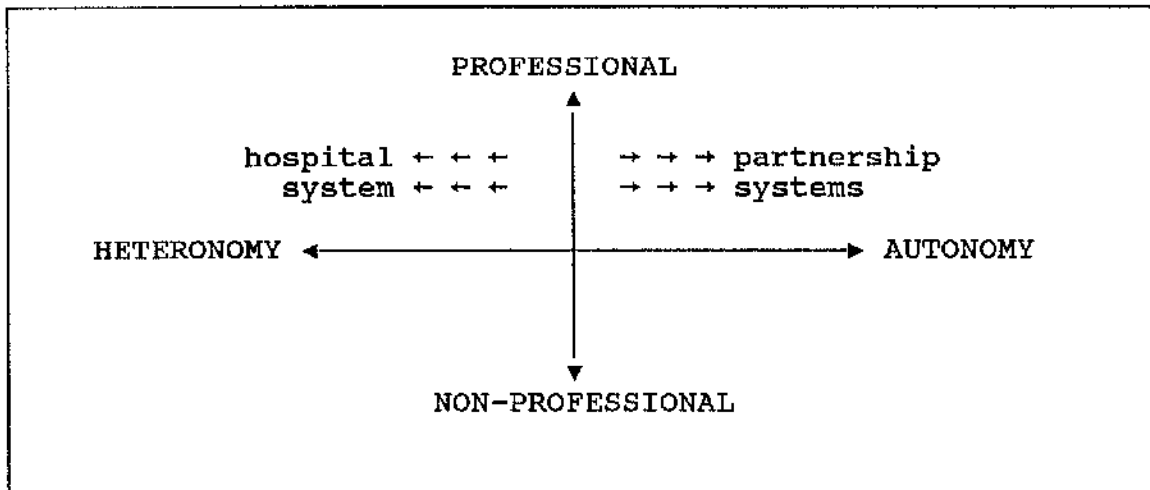
Figure 7.4   *Different competing waiting list systems*

In the terms of the model of Kraemer, as set out in subsection 3.4.1, this problem can be seen as a Service state - Strategic state tension. The central question is which system will survive in the longer run and who will ultimately decide about admission priorities.

Management information systems

The management uses the existing systems especially for budget control functions. There are sometimes discussions about systems which are more directed to performance measurement and cost-control, but it is not yet clear how such systems should be used and which concrete information needs should be satisfied by such systems. Some managers say that information is needed which should monitor medical processes and which should produce performance indicators. This need can be seen as comparable with the reasons to acquire the MIS in hospital 1. The new structure is said to be a 'new start' for such systems, because the cluster managers become responsible for the processes in their cluster. Various interviewees thought differently about the possibility and the usefulness to evaluate *'human processes in medicine'*.

This indistinctness about the management's information needs illustrates that this hospital is relatively far from the Strategic state of computer management. The top management has formal responsibilities with respect to computing, but most of the systems are directed to operational registrations. The management of these systems is delegated to the IS people and they compete with local systems of professionals.

7.4   IMPLEMENTATION OF AN OUT-PATIENTS APPOINTMENTS SYSTEM

In order to get deeper insight into the question of how system decisions are made and how the various parties play a role in this field, this section describes the implementation of an out-patients appointments system in this hospital. The decision to describe the implementation of that particular module is mainly influenced by pragmatic considerations. At the time that I was in contact with this hospital, this project required a lot on the part of the people of the IS department and, besides, some people said that the implementation of this module is characteristic of the implementation of other systems in this hospital.

Current working practices with respect to out-patients appointments
Currently, most partnerships have secretaries (in most cases employed by the partnerships), who still administer the out-patients appointments of the physicians mainly in a manual way. They have regular contacts with the various physicians in that partnership and they are able to tune the appointments easily with the other tasks of the physicians. This procedure is flexible and easy for the physicians, because they can change appointments easily and they have oral contacts with the secretaries about the length of appointments. It occurs regularly that appointments have to be changed or postponed through an urgent operation or other unexpected tasks. Appointments are also changed regularly when the number of appointments on a certain part of the day is fewer than expected and when the physician wants to cluster that with other appointments. If patients want to change their appointments, they have to call that

particular secretary.

The proposal for a new system

Suggested by the IS department, the board says it believes that the automation of the out-patients appointments should be a useful extension of the automated systems of the hospital. The appointments function is captured in a module of the integrated hospital information system. That module, called 'Appointments', is that part of the HIS which aims to support the registration and the administrative processing of out-patient's contacts between physicians and patients.

People of the IS department, managers and the vendor of the appointments system articulated various advantages of a hospital wide computerised appointments systems. The mentioned advantages are described below.

1 Appointments can be made from different workstations. Patients can make different appointments with different physicians in one place. These appointments can be made in a more time efficient way.

2 Appointments can be made day and night. A hospital is principally a 24 hours organisation but it is not possible to make an appointment at any moment with the manual system, because this is until now a place and person related activity. An integrated automated system does not necessarily have such limitations.

3 Appointments can easily be retrieved, changed and cancelled from the workstation.

In a manual system, it is not easy to identify an appointment when a patient has forgotten when a certain appointment had to take place. An automated system can make such a retrieval much easier. The connection with other name/address data in the system makes it possible for secretaries to postpone certain appointments. The system can help secretaries to remember to ask relevant information of patients when they want to make appointments.

4 Appointments can be processed in the administration without much human intervention; this reduces transfer mistakes and administration workload.

Until now, each appointment and each treatment causes a stream of (sometimes manual) forms throughout the hospital. The secretary sends a list of people who have an appointment to the doctor, the doctor returns this list with a code of the treatment. The secretary will use that list to send the relevant information to the administrator of the partnership and to the finance department of the hospital. These people have to input their systems with these data. All these manual and paper based data-streams can be minimised by an automated appointments system. Technically, it is possible to link such an appointments system with clinical systems, planning systems and decision support systems. Such a connection will bring an integrated and consistent hospital information system closer.

5   Use of rooms and equipment can be planned more easily. Central insight into times of appointments can help the management to make more efficient use of the hospital's facilities. It is also easier to look into the central appointments database than to call a number of secretaries about the use of rooms.

6   Statistical information (management information for the national medical registration, the hospital management and the various partnerships) can easily be derived from such a system. An automated appointments system makes it much easier to get insight into numbers of treatments, kinds of treatments, working hours of people and use of facilities. This may help the management to improve their planning and control function. Proper insight in appointments and waiting times of patients may help to reduce waits of patients.

7   If the hospital system is linked with general practices, it should become possible that the general practitioner gets access to the appointments system and that s/he immediately makes an appointment for the patient who is at the consulting hour of that general practitioner. Other possible links with external stakeholders can be favourable.

Identification of interest groups

Each of these advantages can be interpreted as primarily beneficial for one or two

groups. Figure 7.5 shows a matrix where these advantages are related to various interest groups. The IS staff is not mentioned in this matrix as an interest group because they are not particularly interested in one or more of the mentioned advantages. Their interest lies in the increased importance of the IS department as a result of a possibly hospital wide implementation. The administration and the maintenance of such a system will require much of the capacity and attention of IS people and will result in a higher level of importance of this department.

INTEREST GROUP: ADVANTAGE:	External stakeholders Patients	Administra- tive staff	Secretaries	Management	Physicians
1 App. from more workstations	*				
2 App. can be made 24 hrs a day	*				
3 Easy accessability of app.	*		*		
4 Reduction of processing time		*		*	
5 Equipment planning more easily		*		*	
6 Derivation of statistical info.				*	
7 Links with external institutions	*				

info. = information
App. = appointments

Figure 7.5   *Matrix of the advantages related to interest groups with respect to the appointments system*

This matrix illustrates that the main advantages of an integral implementation are:
1) improved service in favour of patients and other externals [advantage number 1, 2, 3 and 7], 2) improved efficiency of the data processing function [advantage number 3, 4 and 5] and 3) improved management information [advantage number 4 and 6]. In the terms of the model of Kraemer (Kraemer et al., 1989, see also subsection 3.4.1), a successful hospital wide implementation can be interpreted as a move to the Skill/Strategic mix state. The control of the IS management will increase (Skill), while mainly managerial interests are served (Strategic). These managerial interests are in the field of the improved efficiency as a result of the decreased processing costs and the improved service to patients and to other external stakeholders such as general practitioners and insurers.

Because of the advantages as listed above, the management believes that it should be essential that the partnerships get access to such an appointments system and that they will use the system for their out-patients appointments. Improved efficiency for the hospital as a whole through better use of facilities, more reliable and efficient administration, improved patient friendliness and the potential advantages in the future (e.g. point 7) were major arguments for the decision to implement this system.

Preliminary study

After a discussion about the possible implementation of this module in the policy group (see subsection 7.3.2) in mid 1991, this group decided that the IS department should carry out a preliminary study. This study should be directed to the current way of making appointments with out-patients and a suggestion how the implementation of a computerised system should take place. This study, which was carried out during the second half of 1991, showed that the current situation with respect to appointments in partnerships was varied. The analysis identified the following different appointment procedures with respect to out-patients.

Two at a time. Physicians in certain specialisms can increase their productivity by using two consultation rooms. When the physician has a consultation in room A, the secretary asks the other patient to go to room B. If the consultation in room A is finished, the physician moves to the patient in room B, while the next patient can go to room A.

Individual appointments with a fixed consultation duration. Other specialisms use fixed durations (e.g. 10 minutes) for one consultation. In practice, this is the average duration so that this system results in waits for patients.

Individual appointments with a variable consultation duration. Specialisms like psychiatry often have relatively long consultations, but they do not use the average duration. Each consultation needs an estimation of the physician involved, of the time which is needed.

Pure block appointments (all patients at the same time). Some (often older) physicians want to have all their patients present at the start of the consultation period in order

to make it impossible that they have to wait for patients.

Free appointments during consulting hours. An alternative is that patients are free to come during certain consultation hours.

This diversity in making appointments made clear that a hospital wide use of an appointments system implies that either the system should be adapted for each individual physician or that the physicians should adopt their own appointments procedure. If the hospital chose the first mentioned alternative, a profound analysis of each partnership would be needed before such a system could be implemented. Another outcome of the preliminary study was that many physicians said they were indifferent about such a system and that many of them argued that there were not enough advantages for them to change their current working practices. The advantages as listed were perceived by many partnerships as *'benefits for others but not primarily for us'*. One of them explained:

> *'I am afraid that we will lose flexibility if a pre-structured system replaces our current system.'*

Another said that he was uncertain about the possible implications of implementation:

> *'replacement of the manual diary by a computerised one is not really a problem for me. But when various people throughout the hospital become able to add new appointments, I feel that I lose grip and influence on my own working schedule. Up to now I can simply tune activities with my secretary but with such a system, things become less flexible for me.'*

This assertion refers to the different possible ways of implementing such a system. Another hesitation was articulated by another physician who said:

> *'I feel that I lose my patients to a certain extent. Up to now they come to my own secretary for an appointment, so they choose to come to my practice. With such a new system, they probably go to an impersonal office where they make their appointments. I become highly dependent on that office while I cannot control them.'*

These doubts refer to the loss of patients (data) and the increased dependence on the hospital organisation. The preliminary study suggested that it is technically possible to implement this system in various ways:

1 The centralised alternative

Patients can only make appointments with physicians at the central appointments office, often located in the hall of the hospital. Within this alternative, it is not possible to make appointments with the secretaries of the physicians. This alternative is clear for patients and it strengthens the perspective of 'being one organisation'. It becomes easier for patients to make appointments with more than one hospital service in a time efficient way and the 24 hours per day service becomes feasible. But physicians will feel they lose a grip on the appointments function and secretaries will lose an important part of their work in favour of a central appointments office. This alternative can be interpreted as the Strategic state alternative, and as a slight heteronomisation move.

2 The local alternative

Patients can only make appointments with the secretaries of physicians, which reflects the old situation. The existing working practices become automated, without changing these working practices fundamentally. Things remain the same, which means a minimum change for patients, physicians and secretaries, but the possible advantages as listed in this section are only partially achieved. This alternative should be typical of the Service state, because local/departmental interests get priority. The professionals and their employees maintain control over these activities. It can be interpreted as a conservation of the autonomy of partnerships.

3 The hybrid alternative

Patients can make appointments both with secretaries of physicians and with a central appointments office. This seems to be the most flexible alternative from the patient's point of view. But at the start it is unclear how patients will behave: how many of them will make local appointments and how many central appointments. That uncertainty causes the same problems for physicians and secretaries as mentioned under 1. This alternative seems to be a compromise between departments and top management (Service - Strategic state) and most attractive for clients, who will enjoy improved service. It can be seen as a slight move from departmental autonomy to heteronomy.

The central and the hybrid alternative are both directions which will demand changes in working practices of physicians. Only the local alternative can make it possible that the current appointments practices of the ± 175 physicians can be taken up in the system. It is impossible for a central appointments office to reckon with so many different ways of making appointments. The various alternatives are put into a table in figure 7.6 and compared with the existing situation. The composition of this figure is based on the information derived from the preliminary study but also on interviews, observations and interpretations.

	CENTRAL SYSTEM	DECENTRALISED SYSTEM	HYBRID SYSTEM	CURRENT SITUATION
How?	Central appointments office	Local appointments offices	Central and local appointment offices	Local appointments offices
Physicians	Decreased flexibility of physicians	Can be adapted in a tailor made way	Fewer flexibility than in the local way but more than in the central way	Much flexibility for physicians and secretaries
IS people	Technically easy to install	Takes a lot of efforts to implement the system according to the different needs of the various partnerships	Relatively complex to install and to manage from a technical viewpoint	IS people are not involved
Top management	Results in increased control, better service and more integration	Barely improves the existing situation from top management's perspective	Improvement in service level for clients and better information	Provides barely reliable management information
State	Move to Strategic state	Move to Service state	Slight move to Strategic state	
Move	Heteronomisation	Autonomisation	Slight move to heteronomisation	Move from autonomous procedures
Patients	Clear and easy and uniform procedure for patients	Limited advantages for patients; it is just a small change. Some of them will hardly notice it	Flexible and easy for patients	Clear but not flexible and easy for patients; but they are used to it
Metaphor	One organisation	Market place with various market stalls	Various interdependent and cooperating units	Market place with various market stalls
Retrieval	Central and local retrieval of appointments data			Only local retrieval
Paperwork	Reduction of paperwork			Much paperwork

Figure 7.6   *Ways of implementation and characteristics*

Implementation strategy

The outcome of the preliminary study (at the end of 1991) was that only a stepwise implementation of the system should be feasible and opportune. Although it is clear for the management and the IS people that a hybrid or a central system should be ideal, it was perceived as being not realisable. All the partnerships would have to agree on such a change and consultation at various partnerships led to the idea that such an assent to implementation was not feasible. If just a few partnerships refused to collaborate, which was almost sure, the whole implementation would fail.

The representative of the physicians in the policy group had already mentioned that he acknowledged the important advantages but that it could mean a reduction of autonomy from the perspective of certain partnerships. However, he believed that some partnerships were interested in an implementation of the system in their partnership but they would only cooperate if the system were to be adapted to the working practices of those particular partnerships.

Because of these findings, the study advised the management to implement the system incrementally, on a partnership by partnership basis. Such an implementation strategy should make it possible to adapt the system to the working habits of the individual physicians which *'should reduce their resistance to an acceptable level'*, as one of the implementators explained. An important limitation of such an implementation policy is that appointments can only be made at that particular partnership. The IS manager and some others said that this is possibly

　　'the entrance hall to more centralised ways of using these systems'.

Implementation

Some of the partnerships which agreed to collaborate with the implementation of this system do not want to be connected with a central appointments office. They only want their own secretaries having access to the system. They feel that when other

people are authorised to enter appointments with them, they will lose control over their time and consequently over their autonomy. An important point is that the secretaries of the partnerships are employed by the partnerships, while the employees of a prospective central appointments office would be managed by the hospital. By delegating this field to employees of the hospital, some physicians feel that they 'will lose control' over their business. The argument of the improved patient's service to make central access possible seemed not to be important enough to convince those physicians. That condition of many partnerships limited the possible advantages of such a system considerably.

The head of the IS department confirms this:

> *'Physicians are only interested in participation if the advantages for them are clear. If they doubt, they continue to use their own system or they buy another system. Actually, the advantages of the appointments system for them are limited. Most advantages are for other functions of the organisation and for patients.'*

The physicians who accepted that their partnership cooperated with the implementation of the system in their partnership had the opinion that it was not really a problem if their secretaries had to change certain working practices, but that they should not accept a change in their own practice of making appointments. Later on, one of the implementors stated:

> *'This appointments system has to be adapted as much as possible in order to make it acceptable for the partnerships. This is sometimes in conflict with the objective to transmit an unambiguous datastream to the finance department.'*

This opinion is confirmed by the finance department, who said that a part of the appointments data had to be adapted manually before it could be processed in the computer system.

Use of the system

The IS director approached one specific partnership in the beginning of 1992 (dermatology) with the question to experiment with this system. This small partnership (three relatively young physicians) with hundreds of short (average time of 5 minutes)

appointments per week believed that they could gain advantages from such a system. One of the implementors said about this:

> *'We started the project 'electronic agenda' with that partnership. They have an enormous volume of appointments but a relatively simple kind of appointment between three and ten minutes. Those three physicians are very positive about such a system. If it works well with them, we hope that it disseminates through the success and to the advantage of the physicians themselves.'*

The IS-department followed a phased approach to implement the system. The phases were: 1) *preparation* (discussion with physicians, secretaries, heads of polyclinics, finance people, IS implementors), 2) *determination of existing procedures*, 3) *adaptation and tuning of appointments system*, 4) *instruction of secretaries*, 5) *testing the system*, 6) *parallel use of the old and the new system*, 7) *using the new system* and 8) *operations and maintenance*, and eventually small adaptations.

This approach implies that a lot of attention is paid to the specific working practices of that specific partnership and limited the reasons for these people to resist. The partnership (including the secretaries) as well as the finance department and the IS staff were positive about this implementation. Major positive points which were mentioned were:

- a more ordered consultation hour administration. This is in the interest of the secretary as well as of the physician;
- that it is easier to help patients with questions about appointments;
- a decrease of the administrative workload through the electronic transmission of data.

Critical remarks were that it takes more time to make appointments with people (also after the introduction period) and that the flexibility is decreased, in the eyes of the physicians as well as their secretaries.

This system was brought into full use in mid 1992 without real problems. After that relatively successful start, other partnerships were approached to implement the

system in their partnership. The implementation approach in these partnerships was similar to the first partnership. This approach can be characterised as having much attention for the current working practices and an adaptation of the system to the existing procedures and much attention to education and experimentation.

In mid 1994, five of the thirty partnerships were provided with the system. IS people agree that these partnerships were most positive and willing to use the system. These partnerships perceived the qualities of the system as beneficial. There is a plan to provide 25 partnerships before the end of 1997 but there are also serious doubts among the implementors whether this will be feasible.

Evaluation

The management says that it still believes that such a local way of implementation gives the hospital major advantages compared with the manual way of making out-patients appointments. One manager said about this:

> *'if you work with such a system, the whole stream of paperwork is replaced by electronic means. If an appointment is recorded by the system, the treatment will also be put into the system. This reduces the workload at the finance department considerably. We can pay the costs of such applications by these benefits.'*

This quotation makes clear that the management perceives the advantages of this system at the internal and operational level, rather than at the level of improved services, effectiveness or innovation.

When the system is widely implemented, there are still the fully decentralised appointments registrations which means that many of the advantages which are summarised in figure 7.5 are not realised. This is because 1) appointments can still only made from one workstation, 2) appointments can still only be made during office hours and 3) linkages with general practices are still not possible.

Another problem is that because of the high level of adaptation to the different

working procedures of the various partnerships, data transfer (mentioned within advantage number 4, see figure 7.5) and the improvement of the planning function (advantage number 5) leads also to processing problems and manual adaptations of transactions. One of the implementers said about this:

> *'The system had to be adapted by this organisation. It is a bought-in package but we had to make it tailor made. Acceptability was essential. If we had directed ourselves too much to the information needs of the higher managerial levels, we should have got problems with the physicians and other medical personnel. In that case, successful implementation should not have been possible.'*

This quotation refers to a possible discrepancy between the needs and the demands of the managerial and administrative levels and the needs of the professionals. This implementor believes that the professionals own the key to successful implementation and that only their cooperation can make implementation possible. To make this point more clear, he said:

> *'Participation during the implementation is essential for us, especially if systems are directed towards the primary process, the curing and caring of people. That strategy has to be well balanced in order to succeed with such systems. We can never say: "we press this system in the organisation". Extensive consultations are needed, but much more: clear benefits for the employees. That is the key point. If a system does not offer advantages for them, it becomes very hard to continue implementation.'*

The main argument to implement this system in the local way is to be sure of the cooperation of the partnership involved. Only partnerships who are willing to cooperate get the system. The policy group hopes that the positive experiences will accelerate the diffusion of the system. An important argument not to centralise this function at this moment is that it does not make much sense when some appointments can be made at a central office and other appointments not. The management hopes that a hybrid form or a centralised form will be feasible when all the clinics have a locally implemented appointments system, but it is not sure when this is the case. Many informants indicated that such a centralised use and broader use of the integrated system could take many years. This observation is in accordance with the observations of Kumar et al. (1993). They focused a study on the simulation

of different structures, modes of decision making and information systems with respect to scheduling in hospitals in order to assess various alternatives. Their study suggests that certain structures and decision making procedures are less optimal than others. In their conclusion they state that

> 'any actual implementation of a problem-solving (information) system (either with or without a change in the structure) would have to include a consideration of other aspects of the link between technology, structure and performance'

> 'thus, imposition of an information system can affect loci of control and distribution of power and, consequently, the acceptance of the system.'

> 'the method of scheduling which has evolved within such structures is often quite distributed; that is, it involves multiple agents who have partial information, disparate (local) goals, and limited communication capabilities' (p. 220).

This quotation suggests that the implementation problems of the appointments system in this hospital are not very specific but rather common in similar organisations when they affect the level and position of decision making.

Interpreting this description within the framework of Kraemer, one can argue that the motives for implementing the system are strongly influenced by strategic advantages, such as improved service and improved efficiency. Gaining these promises should have been an indication that the hospital was moving to the Strategic state. But soon it appeared to be impossible to implement the system in such a way. In spite of that, the management decided to continue with the implementation. This resulted in a strong influence of the IS people, who became responsible for implementing as many systems as possible in a highly adapted way. That served certain interests of the IS department (employment, workload, maintenance), while the locus of control was at the various partnerships. They decided whether and how implementation should take place, which are clearly Service state characteristics. Using the Kraemer model, this can be interpreted as a direction to the Service/Skill mix. This is shown in figure 7.7. The departmental management of Kraemer's model is interpreted here as the partnerships

and its physicians, and not as the various departmental managers of the hospital.

Locus of Managerial Control

		IS Management	Departmental Management	Top Management
Types of Interest Served	Technical	SKILL	Service/Skill Mix	Strategic/Skill Mix
	Operational	Skill/Service Mix	SERVICE	Strategic/Service Mix
	Managerial	Skill/Strategic Mix	Service/Strategic Mix	STRATEGIC

Figure 7.7   A move to the Service/Skill mix state with respect to the appointments system in hospital 2 (Kraemer et al., 1989, p. 30)

Use of the Professional-Heteronomy model leads to the suggestion that the initial proposal to implement a hospital wide integrated appointments system would clearly have had heteronomising effects. But because of the changes which followed, the decentralised and incremental way and the different partnership dependent adaptations, the system can be seen as a strengthening of the autonomy of the various partnerships (each partnership gets an individual system in the way they prefer) and as a strengthening of the professionalism (the professional working habits are respected and preserved). Figure 7.8 shows initial direction (t) and how this turned round at a later stage (t+1).

```
                    PROFESSIONAL
                         ▲
                         |      →   → →
                         |    →   → → →
                         | → →  (t+1)
                       → |→
                      ← →|
                     ← ← |← ←  (t)  ← ←
HETERONOMY ◄─────────────┼─────────────► AUTONOMY
                         |
                         |
                         ▼
                   NON-PROFESSIONAL
```
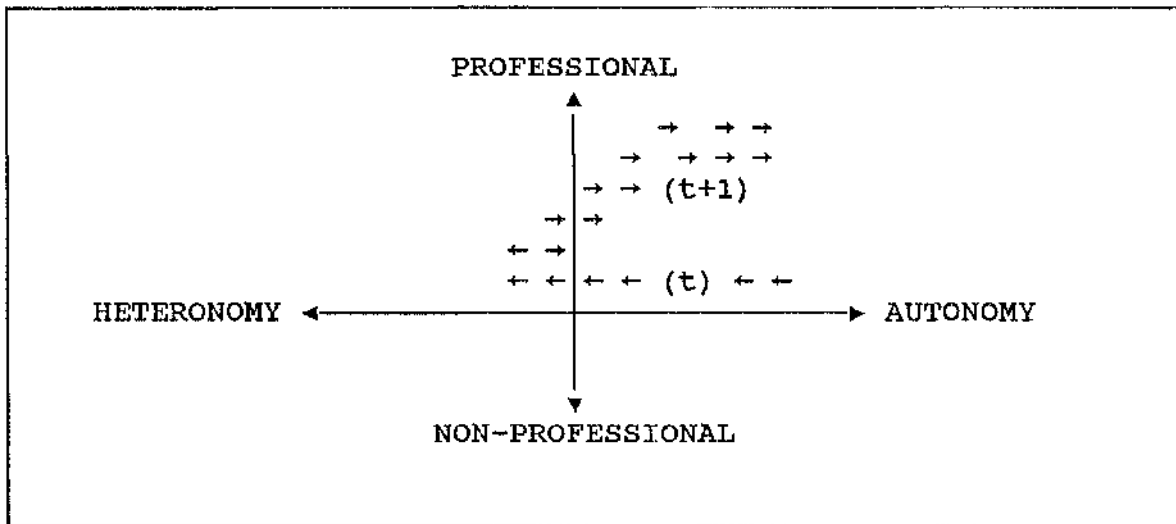
Figure 7.8   Turning directions during the implementation of the appointments system

7.5   INTERPRETATION AND DISCUSSION

This interpretation discusses in subsection 7.5.1 the general characteristics of hospital 2. Subsection 7.5.2 analyses and interprets the use of information systems with the Professional-Heteronomy model, while subsection 7.5.3 is concluded with an analysis in the light of the Kraemer model.

7.5.1 This hospital as a professional organisation

A general hospital in the Netherlands, like the one in this case study, can be perceived as a network of partnerships where each partnership cooperates with the hospital organisation through collaboration, command and negotiation. The relationships among the various partnerships can be characterised by a mixture of cooperation and competition. They depend on each other but also have their own specific interests. These are directed towards the use of facilities, patient streams and

management. It is therefore hard to develop a real common policy in a general hospital and, consequently, to develop an information policy which is feasible and ambitious. In spite of that, many people still perceive a hospital as a unity, which is expected to be manageable and controllable. Moen and Abma (1992) mention seven core problems in this kind of organisation.

1   Coordination possibilities are limited. The physicians are autonomous and cannot be managed by higher managerial levels. The case study shows that the general management is dependent on the cooperation of partnerships with respect to the implementation of information systems which affect those physicians. It is not possible to manage the implementation from one central point.

2   Dual lines of authority (hospital management versus physicians). The hierarchical subsystem of the hospital (as shown in figure 7.9) is organised in a different way from the professional subsystem. This agrees with the assumption of Mintzberg about professional organisations as explained in subsection 2.3.1 and showed in figure 2.4, where he suggests the existence of parallel hierarchies (Mintzberg, 1979, p. 361). Besides, the physicians as well as the hospital management can give orders to staff which leads to dual leadership. This dual authority problem is illustrated in the different waiting lists, where the waiting lists of the physicians are often in contrast with the hospital lists (see subsection 7.3.3).

3   The joint board of physicians barely has the authority to make decisions. The various partnerships have a board which communicates with the hospital management on a regular basis, but this board is not powerful when there is not complete consensus among the physicians about certain issues. This makes it hard for the hospital management to communicate effectively with the physicians. The implementation of the appointments system has to be discussed and negotiated with all the various partnerships. The partnerships would not accept it if that joint board should negotiate on behalf of their partnership so they do not give them a clear mandate.

4   The partnerships interest versus the hospital interest and

5   Conflicts of interests among partnerships and inside partnerships. The objectives of the partnerships can be characterised as: adequate patient-care, to stress the distinctive features, a good income and continuity. This leads to a primary identification of the physicians with their own partnership and their own profession, rather than with the organisation as a whole. Most partnerships do not have an explicit company plan or an explicit vision for the future but they certainly make strategic choices about e.g. investments, secretarial support, management of external relations like the family doctor, possible specialisations within the partnership and the division of incomes. The protection of patient streams will be a major attention point for many partnerships. Partnerships will assess system proposals of the hospital management primarily from the perspective of the partnerships interest rather than from the hospitals' interest. For that reason, the implementation of the appointments system in the central or hybrid form seemed to be infeasible.

6   The strategy will partly be determined by the partnerships and not by the strategic top of the hospital. In practice, the strategy of a hospital is to a high extent the product of the various implicit strategies of the partnerships. Those strategies are partially determined by the characteristics and the possibilities of the hospital. Strategy will consequently be an iterative process. As described, there are partnerships in this hospital which have their own IS policy, which is strictly directed to the partnerships' interests.

7 The dominance of the external associations of physicians makes it hard to implement internal hospital standards. Physicians feel themselves firstly specialist in his/her field, secondly member of the partnership, thirdly member of the medical staff of the hospital and fourthly part of the hospital. This means that the hospital has to deal with many specialists with their own characteristics, priorities, skills and associations. This is an important problem for the creation of a hospital policy. This policy can be characterised in practice by 'the management of various interests' and the management of multiformity.

These seven problems are shown in figure 7.9. The numbers refer to these problems.
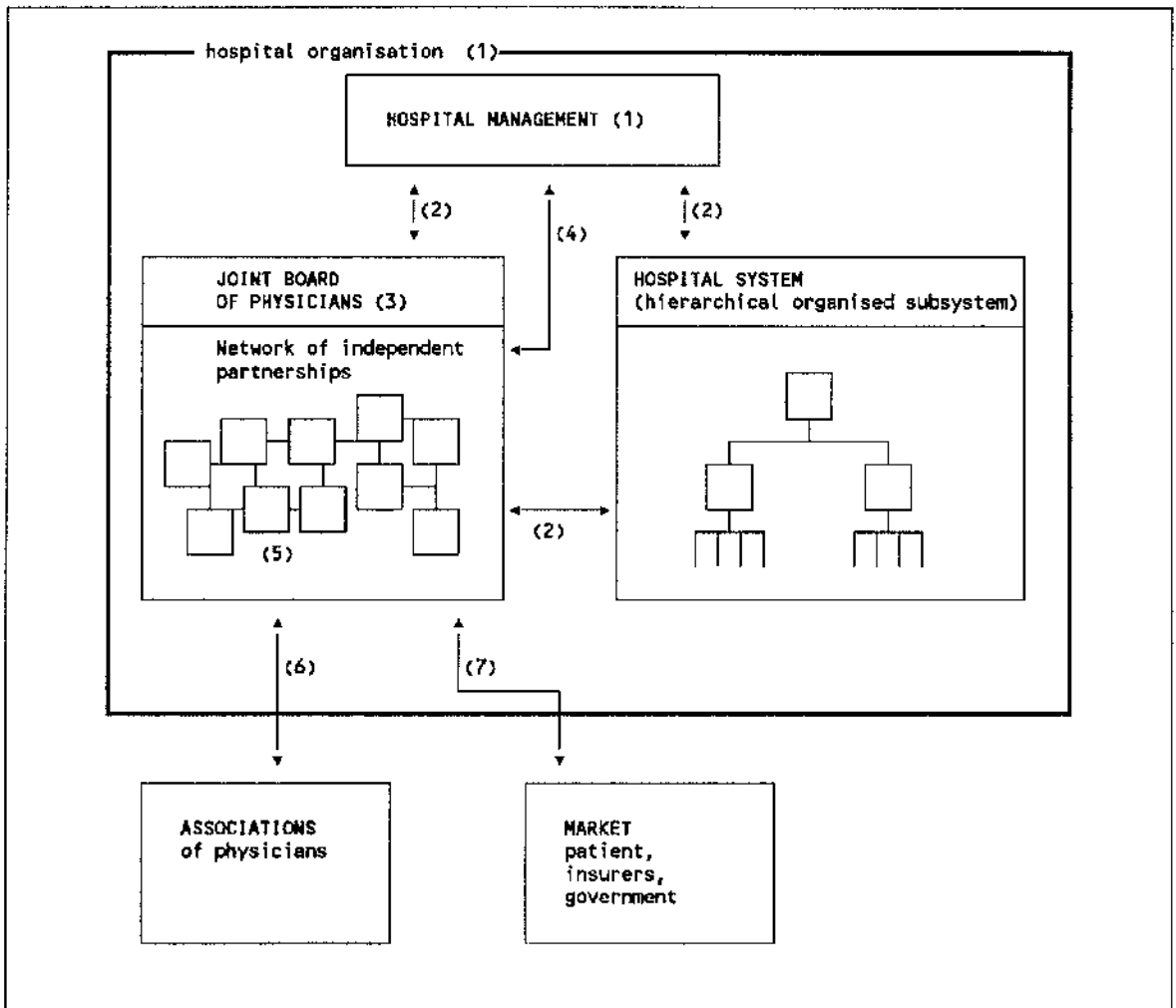
Figure 7.9   *Managerial problems in general hospitals (based on Moen and Abma, 1992).*

7.5.2 Information systems management in the described hospital

A consequence of a structure as described in subsection 7.5.1 is that it has implications with respect to the IS-infrastructure. A number of observations about the

information systems in hospital 2 are described in this subsection.

One characteristic aspect is that this hospital does not have ambitious system objectives. Most systems aim to support the necessary transactional processes in a more efficient way. Systems which cause major organisational change are perceived by nearly all the stakeholders as 'not effective', 'infeasible', 'unrealistic' and 'interesting for other hospitals'. Most of the systems which are used do not really affect the characteristics of this hospital as a professional organisation. These are the so called 'operational and administrative systems' (in Markus' terms, Markus, 1984, see subsection 2.4.1.1).

Another aspect is that the monitoring and control systems are only directed to budget control. There are not yet attempts to standardise or routinise work with the support of information systems. The medical work areas and the financial/ managerial work areas are strictly separated. Because of the structure of independent partnerships, it is not possible to control the physicians with respect to their medical work. They are independent and do not have to justify themselves to the management of the hospital. Financial budgets and the limited facilities of the hospital can only limit the number of patients of a certain kind, but not the way they are treated.

Another point is that expert systems are perceived as the exclusive area of the medical specialists and not as a management affair. Only partnerships which are interested in the application of such systems in their own area may do this, but they are not supported by IS people. The same can be said about the so called 'systems for experts' as discussed in subsection 2.4.1.3 and incorporated in the Professional-Heteronomy model which is shown in figure 2.8. Thus, there are no serious moves to professionalisation or deprofessionalisation through information systems.

Finally can be mentioned that the IS department is primarily directed to the

implementation of integrated operational systems. They try to reach these goals through negotiations, consensus and an open eye for conflicting interests. On the other hand, they do not help professionals if they want to use their own local information systems.

Using the diagram which figures the possible organisational change through information systems, one can draw the situation as described as shown in figure 7.10.

```
                          PROFESSIONAL
                                ▲      Professionals have the
                                       power not to cooperate
                                       with systems which are
                                       not in their interest
    (IS) management promotes            → → →
    operational, administrative
    integrated systems. Local          Professionals are very
    initiatives are not supported      influential in the way
         ← ← ←                          systems are implemented
    Not a PC network                    → → →
    only terminals                     Some partnerships follow
         ← ← ←                          their own IS policy
                         Many operational    → → →
                    and administrative systems
                                   ←│→
HETERONOMY ◄────────────────────────┼────────────────────► AUTONOMY

                      not expert systems
                                │
                                ▼
                        NON-PROFESSIONAL
```

Figure 7.10   *Information systems management with respect to professionals*
                       in hospital 2

7.5.3 Application of the Kraemer model

The top management and the IS professionals of the hospital discussed perceive the use of information systems to a high extent as a support service which demands technical skills. The primary aims are directed towards the implementation of integrated operational and administrative systems. Many of these systems are bought in. Most responsibilities are delegated to the IS department: they are responsible for the eventual design, the adaptation, the implementation and the operation of systems. They have to negotiate with the heads of the affected departments and with the various affected partnerships. The influence of the IS people with respect to the use of information systems is relatively high, because of their expertise and their mandate from the board of the hospital.

The partnerships have the power to accept or to reject certain systems with which they have to work. The appointments system discussed can only be implemented successfully if the physicians of a partnership agree with it. They only agree when the system will be adapted in such a way that it fits well with their existing operating procedures. They are also free to develop or buy in their own systems because their partnership is their own business. This comes near to the characteristics of the Service state: the professionals are in control with respect to information systems.

On the other hand, the IS department does not support such local systems and uses their support as an incentive to participate in hospital wide systems. This again explains the relatively high amount of power of the IS-department. The top management believes that an integrated system which supports operational administrative procedures has to be the main objective for the hospital information system and consequently the main task for the IS department. They do not have concrete plans to introduce systems which make it possible to manage the hospital in a tighter way and to monitor the medical processes more closely.

Summarising, one can argue that the Skill state and Service state are competing. The dependence of the IS staff on the partnerships of professionals and the limitations which are caused by that structure make it possible to conclude that the professionals are in control in the sense that they are able to slow down or stop implementation projects. The power of the IS staff is reflected in their power not to support local system initiatives. Figure 7.11 shows this 'state of computing' in Kraemer's terms.
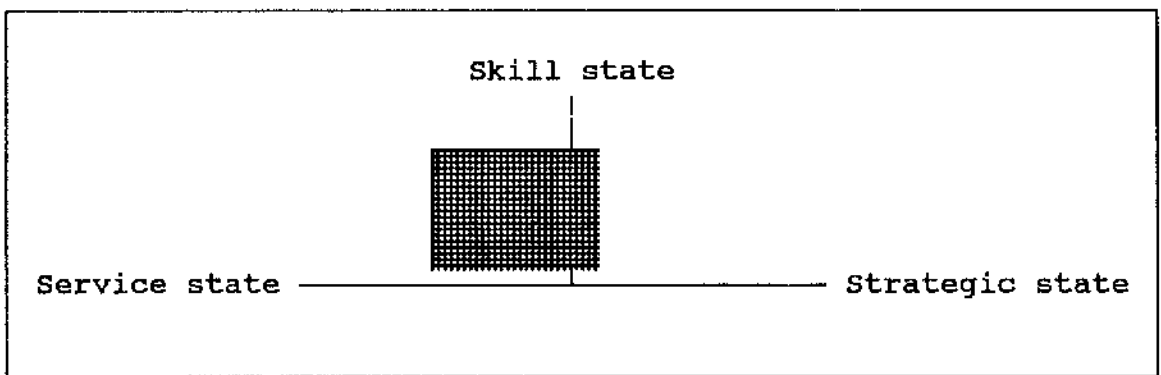
Figure 7.11   *State of computer management in hospital 2 within the Kraemer model*

This leads to the conclusion that the locus of control with respect to computing in this hospital is dispersed: professionals can slow down or stop projects which have a heteronomising consequence, while the IS people refuse to support system implementations which are not in accordance with the hospital wide system. Figure 7.11 illustrates these competing directions. Top management can be seen mainly as a bystander until now.

CHAPTER 8
ANALYSIS

8.1 INTRODUCTION

In this chapter, the two case descriptions will be compared and will be confronted with the approaches and models of the earlier chapters, in order to evaluate the cases as described in chapter 6 and 7 as well as the approaches and models of chapter 2 and 3. Section 8.2 compares the two organisations from various points of view and section 8.3 focuses more closely on the IS-aspects of these two hospitals: the position of the IS departments, the information systems policies and the kinds of systems which are used. Section 8.4 discusses some overall aspects of these cases. Section 8.5 - 8.7 will discuss the suppositions of the models and approaches of the earlier chapters in relation to the analysis of these hospitals, in order to evaluate these models and approaches.

8.2 COMPARISON OF THE TWO ORGANISATIONS

This section aims to uncover similarities and differences between the organisations described from various points of view. The strategies, the structures, the positions of professionals and the interdependencies will be described and compared in order to provide insight into the context in which the professionals have to work and how information systems play a role in these contexts.

Strategy

Mintzberg and Waters (1985) distinguish various styles of strategic management which are strongly related to the kind of organisation in the terms of Mintzberg's typology (1979a, 1983a). They describe the following eight strategic styles.

Planned. Top managers articulate precise intentions and embody these in formal plans that set out what the levels of managers below them are to do. Top management then exert control by monitoring outcomes against plan.

Entrepreneurial. The organisation here is under the personal control of the leader and strategies flow from the unarticulated vision of a single leader.

Ideological. Strategies are the intended patterns in action expressed in collective beliefs. The ideology embodies the organisation's intention and control is through indoctrination and socialisation.

Umbrella. Overall targets and boundaries within which managers lower down formulate their own strategy.

Process. Here the leaders define the overall targets and set the boundaries within managers lower down actually formulate the content of the strategy. Control is exerted by monitoring achievement against target and behaviour against the boundaries.

Unconnected. Here there is either no central intention, or groups of people produce strategies in direct contradiction to central intention. The organisation's strategy therefore flows from a collection of unconnected strategies formed by groups within the organisation.

Consensus. People converge on a common theme through agreement, without any central managers directing them.

Imposed. This occurs when the environment dictates what has to be done.

Mintzberg and Waters (1985, 1991) suggest that pure professional bureaucracies will follow the unconnected style of strategic management. They argue that individual professionals or related groups of professionals (e.g. the partnerships of physicians in hospitals) will determine their own strategy within their organisation. That is one of the ways in which they feel themselves autonomous and most able to determine what has to be done.

A closer look at these two hospitals gives a more mixed image of the practice of these hospitals in particular and perhaps of professional organisations in general. Despite the fact that many people in hospitals recognise some characteristics of the

unconnected strategic style, it is clear that the changing environment of hospitals (as discussed in chapter 5) explains the tendency to more cost control and consequently to a more imposed style of strategic policy. Mintzberg (1979a, 1983a, 1991) argued that such changes affect the typical characteristics of a professional organisation and may cause a move to other forms such as the divisional organisation or the machine bureaucracy. Figure 8.1 illustrates this dynamism.
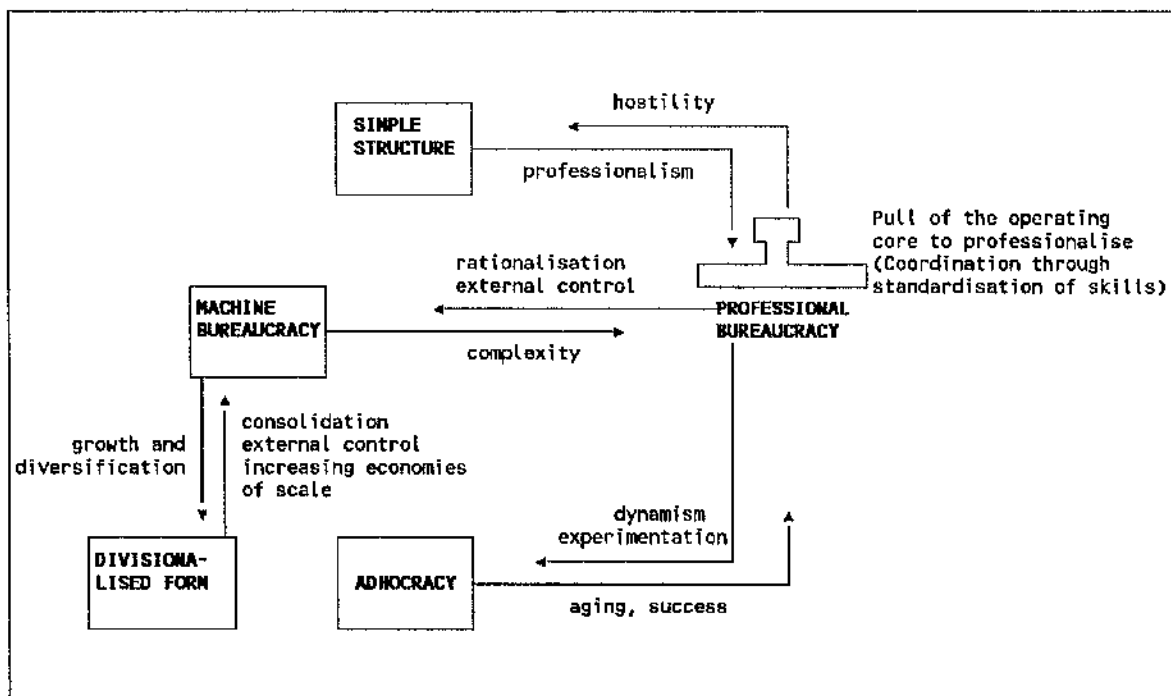
Figure 8.1   *Pulls on the professional bureaucracy in different directions (based on Mintzberg, 1983a, p. 286-287)*

Mintzberg suggests explicitly that opportunities to rationalise primary processes or increasing external controls may move professional bureaucracies towards the direction of machine bureaucracies. Hospital 1 attempted to use certain information systems (like the MIS) to rationalise and to standardise primary processes. At the same time, the local information systems in that hospital could be interpreted as expressions of dynamism and experimentation which should be more characteristic of the adhocracy.

Growth and diversification have subsequently moved hospital 1 to the divisionalised form, despite the mutual dependencies of the various divisions. It is clear that Mintzberg's categorisation in five basic forms is a framework in which one can globally put organisations into a certain category, but various tendencies will often give a mixed image. Many organisations, like these hospitals, are moving from one configuration to another; information systems will often play a major role in the reinforcement and the weakening of such processes.

Within these various developments and pressures, the first hospital uses the umbrella as well as the process model to formulate and implement an organisation wide strategy. Each division has to develop a plan within the general strategic plan and has to quantify this and to put it into timetables. This takes place in an annual planning process, which is imposed by the top level. These plans are quantified in terms such as numbers of patients, amounts of money and other measurable objectives. This is a style of strategy formulation which is closer to divisionalised companies and machine bureaucracies.

In the second hospital, the various independent partnerships of physicians have their own ideologically based plans which are not consciously connected with a grand plan. This concept is closer to Mintzberg's expectations about professional bureaucracies. The partnership strategies are in many cases not written down in a formal strategic plan, but much more carried out as a style of work, the result of years of education, socialisation and indoctrination (in Mintzberg's terms). Besides, general management strives towards consensus between the partnerships and the department heads.

These approaches to strategic planning are shown in figure 8.2. We can conclude that strategic planning in these hospitals does not have the purely unconnected style which Mintzberg suggests, although the second is nearer to Mintzberg's assumptions about strategy formulation in professional bureaucracies. In both cases, the implementation of the various strategies can be characterised by the term 'incrementalism'. Fast

organisational changes, an adaptive style and working according to systematic stepwise plans were said to be unrealistic and unfeasible in both hospitals. The working practices and traditions of physicians which have developed over many years, cannot be broken down quicky. Figure 8.2 summarises the different strategic styles in the terms of Mintzberg and Waters as they are observed in hospital 1 and 2.

```
┌────────────────────────────────────────────────────────────────────┐
│              Strategies of hospitals are                           │
│              imposed by budgetary limitations                      │
│                          │                                         │
│         ┌────────────────┴────────────────┐                        │
│  ┌──────┴──────────────────┐   ┌──────────┴──────────────────┐     │
│  │ HOSPITAL 1:             │   │ HOSPITAL 2:                 │     │
│  │                         │   │                             │     │
│  │ Umbrella / Process      │   │ Consensus                   │     │
│  │            │            │   │    │                        │     │
│  │   ┌──┬──┬──┬──┐         │   │ Unconnected                 │     │
│  │   Planned / Imposed     │   │    │                        │     │
│  │                         │   │   ┌─┬─┬─┐                    │     │
│  │                         │   │   Ideological               │     │
│  └─────────────────────────┘   └─────────────────────────────┘     │
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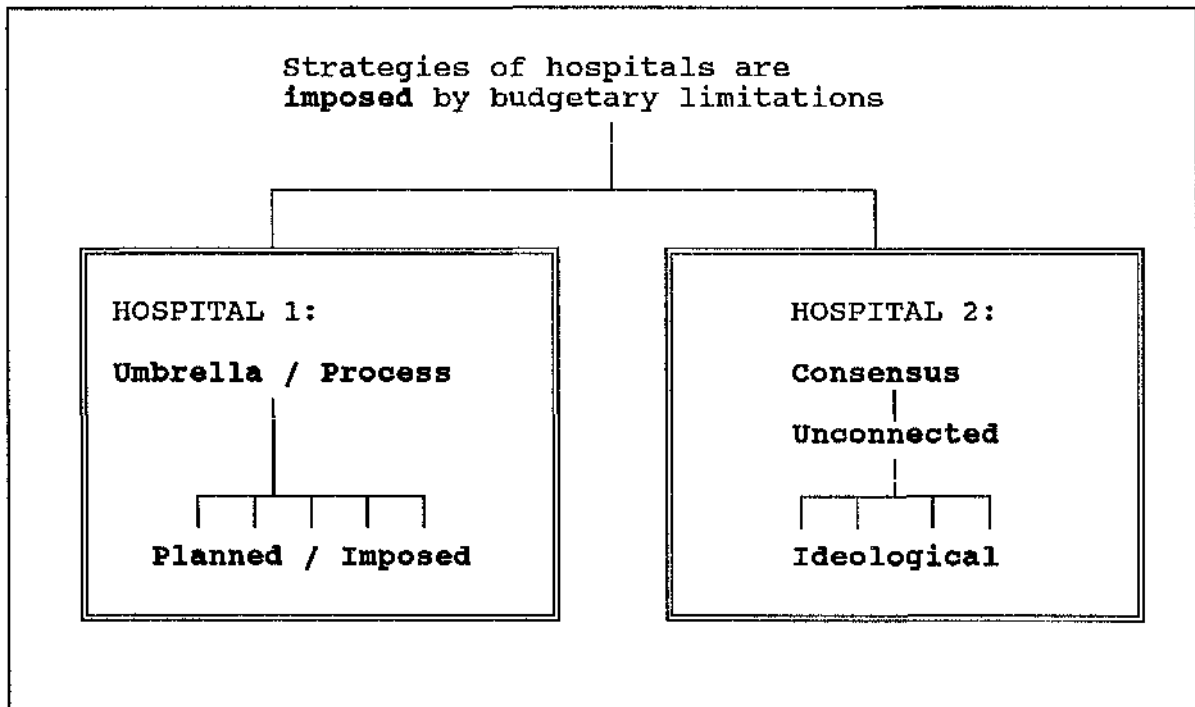
Figure 8.2   Various strategic styles in the terms of Mintzberg and Waters (1985) with respect to the discussed hospitals

Both strategic styles and strategies lead to the idea that general strategies and (consequently) IS/IT strategies of hospitals can differ considerably. Important questions and managerial dilemmas and issues with respect to this include:

- the possible striving towards predictability or cure and care (e.g. through a high percentage of patients with chronic diseases);
- the possible use of treatment protocols (the striving towards a standardised treatment or to a more individualised system for doctors and patients);
- to work in a mono- or in a multi disciplinary way. Striving towards the involvement

of many or few medical disciplines with respect to the treatment of a patient;

- the level of integration; striving toward a high or limited level of coordination among physicians, nurses and extra mural workers with respect to the treatment;

- the required and expected consciousness of efficiency of professionals with respect to the optimal use of beds and equipment, and

- the need to become more patient focused, where patients do not see their problems in neat disciplinary terms (Dawson, 1994).

Structure

The structure in hospital 1 can be characterised as departmentalisation by product oriented divisions. These divisions try to work as autonomously as possible; the divisional managers are responsible for the tasks of their division. The professionals have employment contracts with the hospital and they consequently have a certain position within that structure. The hospital tries to involve physicians in the management of the organisation by appointing physicians (often professors) to management positions: such physicians are responsible for a medical department or for a medical division as a whole. These physicians are supported in this managerial task by professional managers and by heads of nursing departments. This hospital is clearly moving in the direction of integration where the management has the role not to be only facilitative but also overall responsible. The involvement of physicians in the management of the hospital can be perceived as a conscious policy to reach the goal of integration and control. The board believes that without this participation of physicians in the management, the objective to become an integrated company would not be attained. The board introduces control processes, company controllers, systems and objectives which are intended to help the divisional managers to increase their grip on the organisation.

Hospital 2 has a functional organisation; the various hospital functions (nursing, laboratory, staff, domestic affairs etc.) are put in various separate departments. The

physicians do not have an official place in the structure; they have their own 'company' and perceive the hospital as a facilitative organisation. This leads consequently to a lower level of involvement and participation of physicians in the management. This traditional structure will be changed gradually into a more product oriented structure: different medical clusters, managed by cluster managers will replace some of the functional departments. These cluster managers will not be physicians in most cases. So one can also perceive in this hospital a certain change in the direction of more professional involvement and a product oriented organisation, but obviously to a lesser extent than in hospital 1.

The separate position of the various partnerships delays that process: the cluster managers do not have a higher hierarchical position than the physicians and they do not have the formal power to change practices and procedures which affect the work of physicians. The decentralised way of implementation instead of the centralised way of the appointments system as described in section 7.4 is an example of the lack of formal power of managers to change working practices of physicians.

Position of professionals, metaphors and interdependencies
Physicians who are organised in partnerships of physicians perceive themselves as members of a small unit of experts. They feel themselves fully responsible for the treatment of patients, many of them believe that patients ask specifically to be treated by them and feel that they are the central orientation point of the organisation. Because they can no longer treat patients in private (home based) practices, the hospital makes facilities available which help them to do this work. Figure 8.3 shows this concept of a hospital. Quotations of physicians which illustrate this concept are:

> *'The hospital is a facilitative company.'*

> *'Other departments have to support us to do this work.'*

> *'They (other departments) have to offer services at our request and according to our quality standards.'*

'Managers have to organise these facilities.'

'Patients are not satisfied because there are appropriate parking facilities or because there is good food, a good nurse or a good director. They are only satisfied when they are well treated by a competent and professional doctor.'

Scott (1982) stated about this organisational concept:

> 'The primary tasks carried on within hospitals are diagnostic and therapeutic activities for specific patients. For the most part, individual practitioners, the most important of whom are physicians, conduct or direct these activities. Physicians organize themselves as overseers of these activities to ensure patient/client needs are met and to protect individual practitioners from inappropriate control attempts by nonpractitioners' (p. 217).
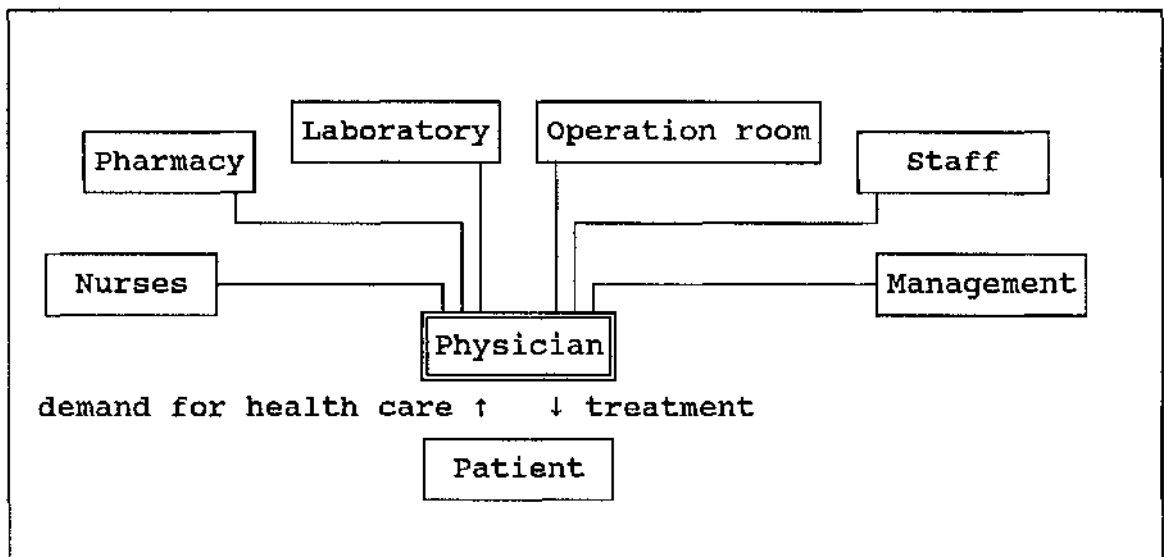
Figure 8.3   Physician as the central orientation point in the hospital

Within this concept, a hospital organisation is perceived as mainly facilitative (Dawson, 1994, p. 3-4). The organisation is physician driven; a physician requests services from other departments such as the nursing, laboratory, pharmacy but the physician is the central element in the hospital organisation. Such an organisational concept gives a central place to the physician - patient relationship, and to the autonomy, the professionality and the responsibility of the individual physician.

Within this concept, the information systems should be primarily directed to the support of individual physicians and their information needs. The information systems department should have a supporting attitude to the physicians, according to the Service state (Kraemer, 1989). Information system objectives will be primarily directed toward professionalisation and autonomisation of physicians.

Tap and Schut (1987) introduce the metaphor of the *shopkeepers' association* in a shopping centre to illustrate this organisational concept. The various shopkeepers are organised in an association to advance the interests of the avenue where the shops are located. But each of the shopkeepers have their own particular interest. Within that metaphor the shopkeepers -the partnerships of physicians- are primarily directed to advance the interests of their shop, while they expect that the hospital managers organise the pavement, the streetlight, the safety etc. in the 'Hospital Avenue' as they call it.

A variation is the hospital as a *market place,* where the partnerships are the owners of the market stalls. In all these images the patients are primarily visitors and customers of physicians, rather than from the hospital; the business is at the shop, in the contact between patient and physician. The income of shopkeepers, owners of market stalls and physicians depends on the numbers and the prices of sold goods and/or treatments.

A limitation of these metaphors is that they do not incorporate the dual command structure (hospital management versus physicians) which can be observed in general hospitals. Shopkeepers in a shopping centre or stallholders on a marketplace cannot command the people who clean the streets or repair the lights, while physicians in general hospitals have the authority to give orders to people of nursing departments, laboratories and other services. This is perceived as a part of the professional autonomy which may come into conflict with the priorities of the hospital

management. The waiting list problem of hospital 2 is an illustration of such a dilemma.

The second hospital has many characteristics which come close to this metaphor but the trends which are summarised in chapter 5 explain that this hospital is also moving slowly towards more integration.

The metaphor which is used to give an image of the so called 'integrated hospital' is that of a *department store*. The departments sell different products, but there is no direct competition among them, there is a higher level of interdependency among units, salaries do not depend directly on the turnover, and there is not a command structure from two different parts (management and physicians). In the hospital as an 'integrated company' are various interdependent units which produce intermediate products in order to treat and to heal patients. These interdependent units have to be managed by professional managers in order to work in a well balanced way. Not the physicians but the managers orchestrate the various functions, professions and units in the hospital. This is a move from physician driven to managerial driven hospitals.

The information systems are primarily directed to the support of managers by giving them the information to manage the units adequately. Managers will try to reach the Strategic state of computing in Kraemer's terms (Kraemer et al., 1989). Consequently, the objectives of information systems will be directed towards heteronomisation and perhaps deprofessionalisation. Figure 8.4 shows this concept.
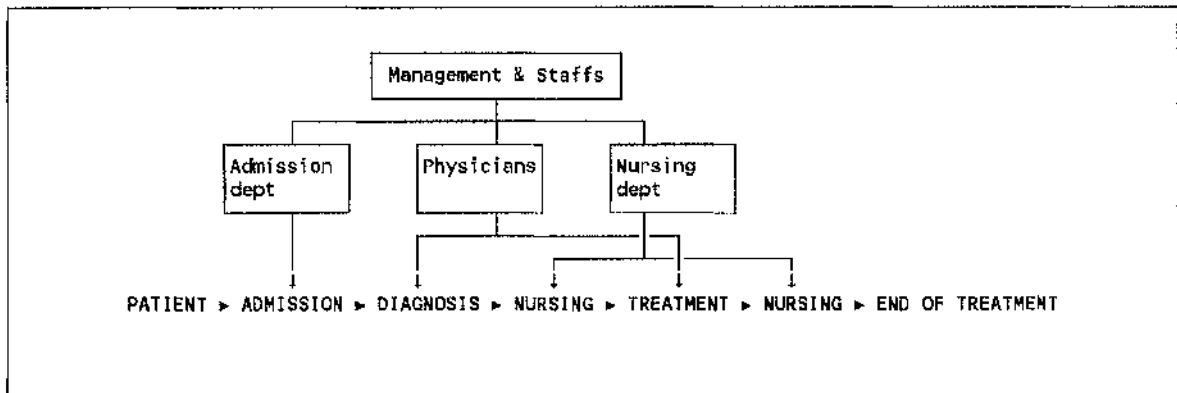
Figure 8.4   *Hospital as integrated company; management driven*

Interdependencies in hospitals

It is important in this context to consider the (changing) organisational characteristics of hospitals. This makes it possible to understand the nature of change in these hospitals and helps to compare them with each other and with other (professional) organisations. The approach of Thompson (1967) can be used to interpret the practice in hospitals.

Thompson distinguished pooled, serial and reciprocal interdependencies among departments and units in one organisation. Pooled interdependence is the weakest form of coherence among departments, because departments work independently on their own tasks. Serial interdependence is a one sided dependence, because the output from one unit is input for the next unit. Reciprocal interdependence is the strongest form because the outputs from A are input for B and vice versa. Figure 8.5 illustrates these three basic forms.
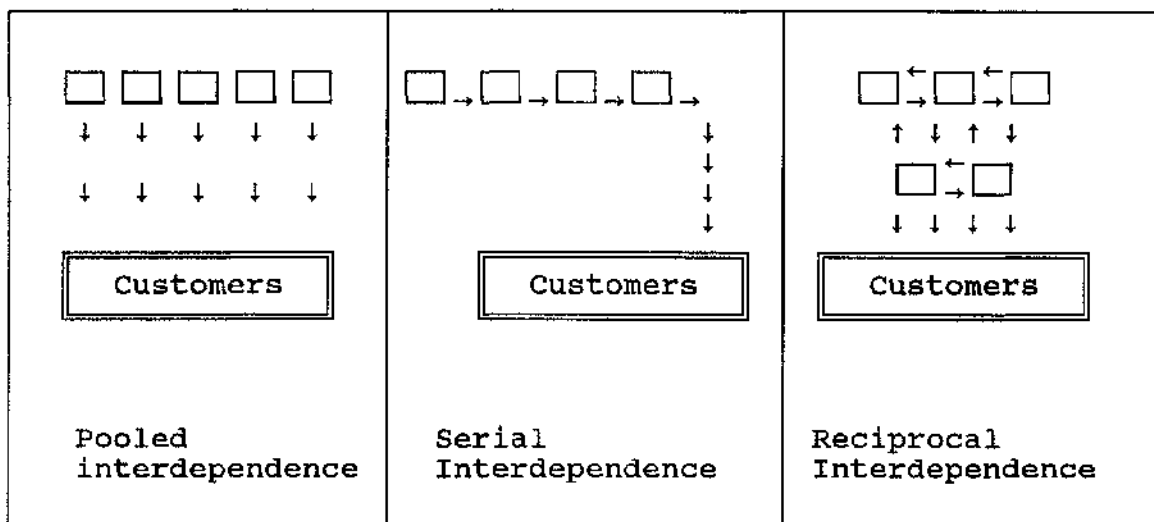
Figure 8.5   *Kinds of interdependencies among units in one organisation*
                 (Thompson, 1967)

In Thompson's terms, hospital 1 tends towards reciprocal interdependence in a relatively weak form. In a weak form, because in many cases a treatment is started, organised and finished by one doctor. Not every patient moves from department to department and from division to division. But in other cases, treatments are more complex, and patients move from one department to another and are treated by many doctors and nursed by more than one unit. In these situations, the various actors from different departments depend very much on each other in terms of communication, information exchange, procedures and work standards. The management of hospital 1 strives towards more integration through standardisation and towards common use of data.

The tradition of the physicians, and the practice in hospital 2, is one of perceiving the hospital as having pooled interdependencies. It provides a roof for many private practices of doctors with some common facilities. This is an extension of the many private practices of medical specialists at the end of the 19th and the beginning of the 20th century, as described in chapter 5. These changes illustrate the tendency as

showed in figure 8.6.

| Private practices | → | Pooled interdependency | → | Reciprocal interdependency |

hospital as facilitator for continued private practices

hospital as integrator of various disciplines operating as a unit
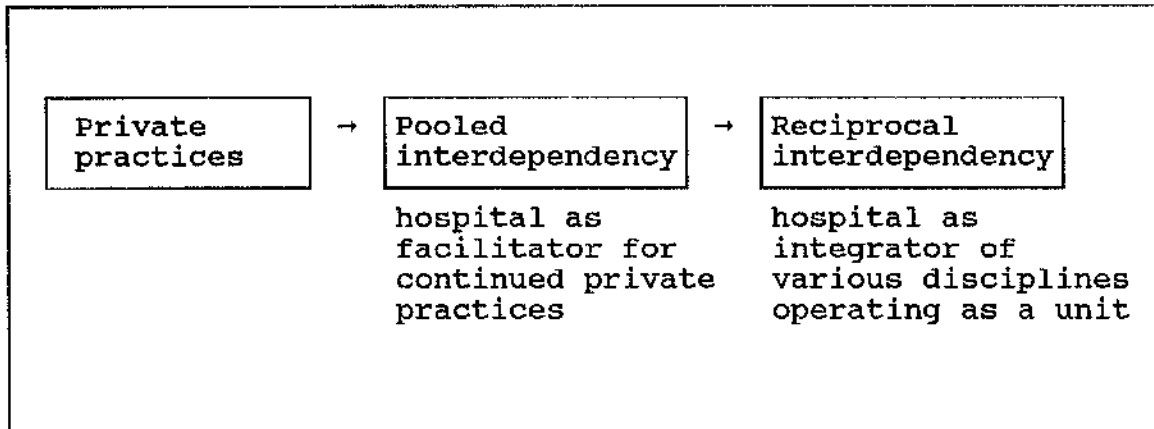
Figure 8.6   Character of change in hospitals

Such changes will progress very slowly, often with 'two steps forward and one step back'. The policy of the first hospital is clearly to move to the reciprocity among units, while the second hospital is more locked in the situation of pooled interdependency.

Higher levels of interdependency will affect the level of professionalism. Professionals are -among other features- characterised as having autonomy as described in chapter 2; professional organisations will consequently -according to this force- tend to the pooled form. Moving towards reciprocal interdependency will decrease this autonomy and will influence the way of cooperating with other people (including colleagues).

McKinlay and Arches (1985) argue that this move towards more reciprocal interdependency implies the breakdown of the diffuse and mystical medical arena into discrete and manageable components, which makes the physician an expert in a limited area rather than a 'generalised wise man'. They state:

> 'And once medical activity becomes segmentalized it is rendered more understandable and less imbued with protective mysticism. It is possible to argue therefore that, through a high degree of specialization, the technical base of medicine is being continually narrowed and demystified making it vulnerable to codification into a set of bureaucratic rules and procedures ripe for

computerization and easily grasped by those without a formal medical training' (p. 177).

From this, one can conclude that hospitals can strive for different organisational models with respect to professionals, as showed in figure 8.7.
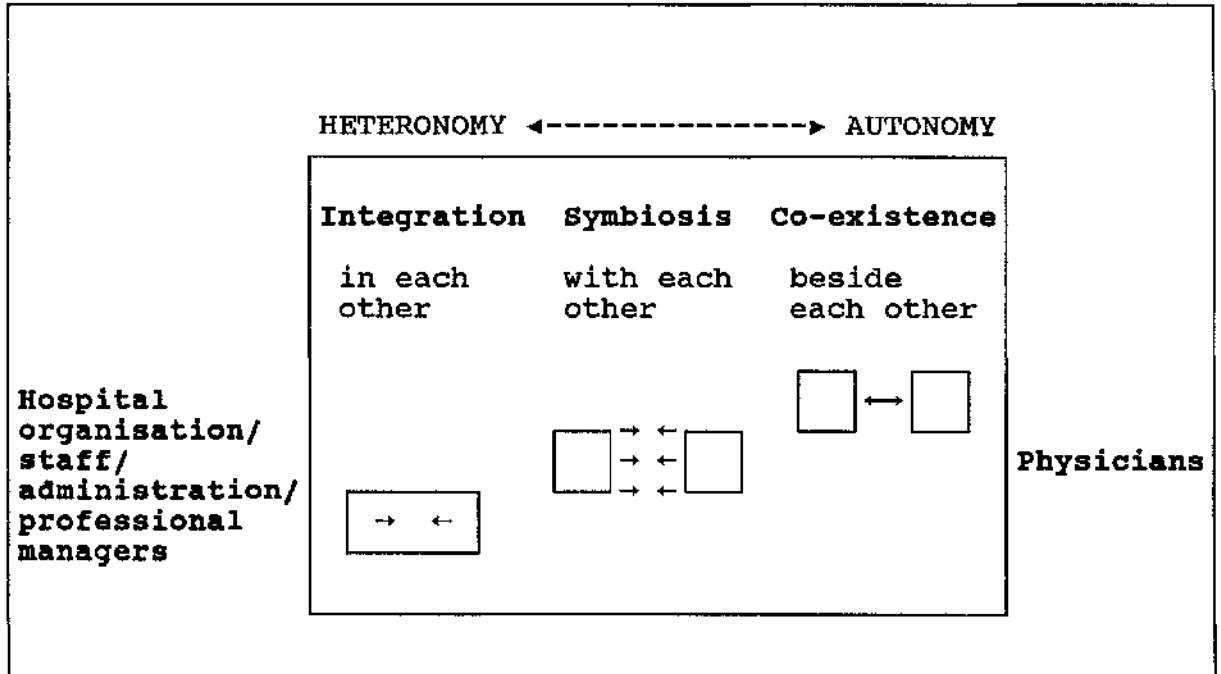
Figure 8.7   Different models with respect to the position of physicians in hospitals

Co-existence

In the co-existence model, the separation of the hospital organisation and the physicians is emphasised. The physicians work on an individual and autonomous basis and the hospital organisation just creates facilities for the physicians. That hospital organisation is organised in a hierarchical way. Contacts between medical staff and hospital management are irregular and ad hoc. Information systems of both entities (partnerships of physicians and hospital) will be highly separated and incompatible.

Symbiosis

The medical staff is more tightly organised but they have still a separate place outside

the hospital organisation. The tighter structure is related with aspects such as rules of behaviour, norms, cooperation, medical policy and collegial control. The hospital does not only create conditions but has a coordinated and directed policy to facilitate the work of physicians. Information systems need to be adapted in order to make them compatible and partially integrated.

Integration

There is a high level of cooperation among physicians, hospital management, nurses and para-medical professions. There are regular consultations. The medical staff and the hospital management have joint responsibility for the policy matters of the hospital. Information systems will be organised and managed from one consistent perspective. Most systems will be integrated and will use one common database.

As discussed before, the first hospital is moving to the third model or has at least policies which aim to become an integrated hospital. The second hospital can be placed between co-existence and symbiosis, but slowly moving to more integration. Especially the advancement of knowledge, which causes increasing specialisation, creates the need for more multi-disciplinary teams and integration of care for patients (Dawson, 1994, p. 13). But also other factors, such as the increasing size of many hospitals, high capital investments in modern medical technologies and more competition among suppliers of health services are explaining factors of the move to more integrated organisational arrangements.

Figure 8.8 summarises the comparison of both hospitals. Section 8.2 concentrated on the top part of that figure, while section 8.3 will focus on the comparison of the information system infrastructures of both organisations.

8.3   COMPARISON OF THE IS INFRASTRUCTURES

8.3.1   Systems as a reflection of other organisational arrangements

As a consequence of the move towards more integration and heteronomy in hospital 1, one should expect that the use of information systems will strongly support that move. In practice, that is partially the case. Information systems which are used in organisations can partially be perceived as an inheritance from the past. This is reflected in figure 6.13, which shows the changing states of computing in hospital 1. The locus of control with respect to computing is gradually moving from the IS department along user departments to the higher managerial levels. Each group has certain favourite systems which are still used or which are in the implementation stage.

The IS department is mainly responsible for the upkeep of the organisation wide database which supports certain operational functions. Users and user departments utilised their influence to design and implement local systems which are often unconnected with that integrated system, while the top management promotes the MIS, which can be seen as a move to the Strategic state of computing. Through this development, the systems portfolio can be characterised by multiformity: different groups with partially conflicting interests use information systems to advance their particular interests.

	HOSPITAL 1	HOSPITAL 2
Strategic direction	Involvement of physicians in macro matters, Budget responsibility for physicians Medical excellence protocolisation, control of patient streams and medical treatments	Budget control consensus good level of health care patient friendliness
Kind of strategic management	Imposed, umbrella, process planned on divisional level	Imposed, consensus. Partnerships have their own unconnected ideological strategy
Structure	Product oriented divisions	Functional, moving to product structure
Position of professionals	Employment contract Moving to integration	Independent partnerships Co-existence / symbiosis
Move towards	Heteronomisation increasing level of control certain degree of autonomy within divisions	Within the relatively high level of professional autonomy budget control. Slow move towards more integration
Information systems	Local IS, partially integrated and operational IS, centralised and management IS, centralised	Operational IS, centralised, integrated. Certain isolated systems of partnerships and private patients registration systems. Double waiting list systems
IS department	Partially decentralised partially cost centre partially centralised service centre, control function	Service centre (services are limited and not charged)
State of computing	From Skill/Service to Service/Strategic	Skill/Service

Figure 8.8   Comparison of hospital 1 and hospital 2

One cannot speak of a consistent and coherent set of systems but rather of a set of systems which reflects the influence of various interest groups in this hospital. The introduction of the MIS versus the existence of many local systems which are not developed or designed from one central viewpoint can be interpreted as a reflection of the various forces within the hospital and as an indication that the IS/IT field can

become a battleground of various interest groups to advance their particular interests. This example shows how the increasing influence of the hospital management affects the autonomy of physicians: the MIS strengthens the position of managers to the detriment of the individual autonomy of physicians.

In hospital 2, one can perceive a similar process with respect to the control over computing but with a different outcome. This different outcome can be explained by the different organisational characteristics. As described in section 8.2, hospital 2 fits more with Mintzberg's description of a professional organisation. The top management is less influential (also with respect to computing) than the top management in hospital 1 and the partnerships of physicians of hospital 2 follow their own independent strategies. The IS department is in charge of computing but feels itself limited by the (lack of) cooperation of the partnerships to advance top management's interests. Partnerships only want to cooperate if systems advance their interests unequivocally. This leads to a situation where the IS department tries to implement organisation wide and integrated systems but becomes limited by physicians and where physicians try to advance professional interests but becomes limited by the lack of support of the IS people. This explains the mix between the Service state and the Skill state which is shown in figure 7.7 and 7.11. Again, each particular interest group tries to advance its interests through information systems, but other groups limit the ability to do so. In hospital 2, this leads to the use of operational support systems which hardly affect the work of physicians. The way of implementation of these systems is limited by the willingness of the physicians to cooperate. On the other hand, not many physicians use physician support systems because the use of such systems is not supported by the IS-department. This can be seen as a vicious circle: physicians decelerate implementation of integrated systems, while the IS-department does not support local systems.

Specific management information systems with monitoring and control purposes were

perceived as not opportune. By this, interviewees meant that the management is not influential enough to implement and use such a system effectively, given the power of the physicians. In this hospital we see again multiformity which leads to a more limited and restricted use of information systems: only transaction systems which hardly affect the work of physicians are perceived to be acceptable.

8.3.2 Position of the IS department

Through the changing states of computing in hospital 1, the position of the IS department is consequently changing. During the Skill state, they were seen as the experts and they used their expertise and their expert power to implement systems which had integrative and operational characteristics. Dissatisfaction of user departments about the lack of systems support and the lack of quality of systems support led to local information systems, which resulted in a diminished influence of the IS department. It is also significant to note that the implementation of the MIS was delegated to a project group which worked separately from the IS department. Apparently, top management was not sure that the IS department could implement that system successfully. In this hospital one can observe an IS department with a decreasing influence, looking after its mission and identity. Questions such as: *'who is our customer?'* (top management, division management or physicians?) *'are our services free of charge?' 'are we responsible for the quality of the demands?'* and *'is it possible to be similarly adviser and controller with respect to IS applications?'* are questions which show how changing states of computing lead to identity questions in such a department. The Professional-Heteronomy model provides some alternatives which may help to consider and to discuss these questions. Various demands from different interest groups are conflicting: some systems aim to heteronomise or to deprofessionalise, while other systems have an autonomising or professionalising consequence. It is not easy to support such conflicting demands similarly.

8.3.3   Reactions of professionals to system proposals

With regard to the management information system of hospital 1 as well as the centralised option of the appointments-system of hospital 2, resistance against such systems on the side of the physicians can be observed. Some people interpreted such resistance as a general resistance against change. They wondered why physicians -who are often so positive about medical computer technology- had such an inflexible attitude towards other IT applications. Scarbrough and Corbett (1992) argue that resistance against change is stronger when it implies organisational change rather than technical change. This basic idea is shown in figure 8.9. What they call *'conventional technical change'* as well as *'advanced technical change'* will rarely affect the position of the professionals involved and will often be implemented by themselves and at their request.

The centralised appointments system of hospital 2 and the management information system of hospital 1 are examples of organisational change which are not at their request, which are not managed by themselves and which are not directed to advance their working conditions but rather the position and working conditions of other people such as managers, staff people and clients. This illustrates again that the question to what extent new systems affect or may affect the position of professionals is critical.
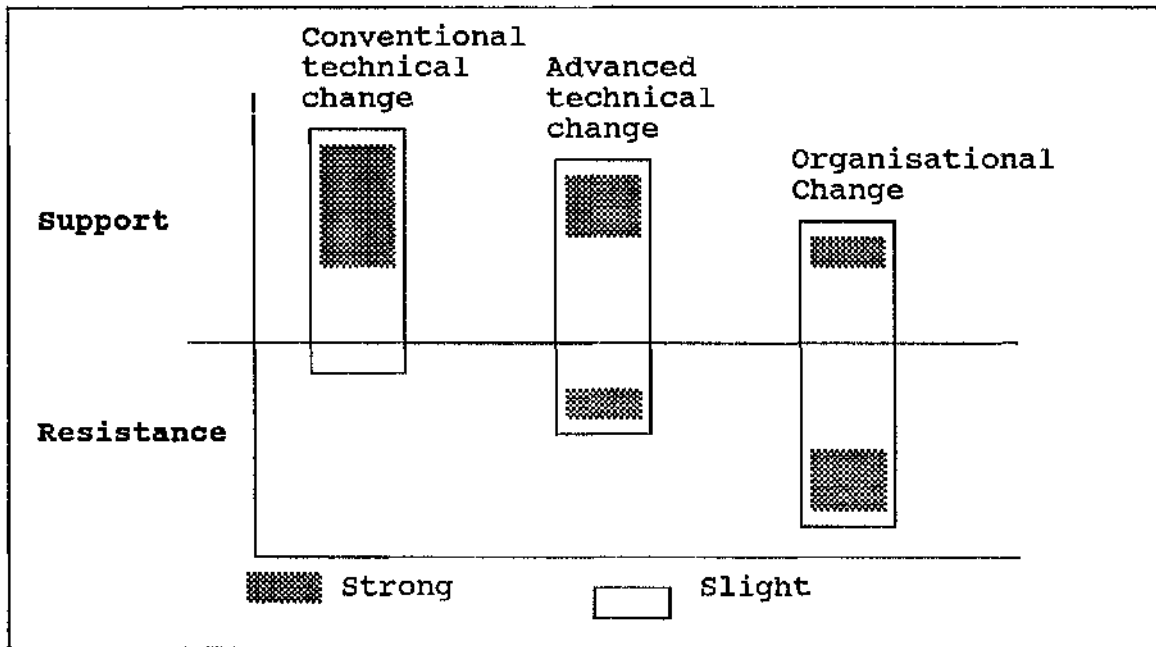
Figure 8.9 *Reactions of workers to different forms of change (Scarbrough and Corbett, 1992)*

A feature of physicians which could be observed was a high interest in real professional activities such as the diagnosis and treatment of patients, professional contacts with colleagues and other activities which have real medical characteristics. A staff employee put it very clearly: *'Doctors want to cure'.* That attitude of many physicians also leads to a low interest in other hospital matters. The quotation of an employee of hospital 2 which is quoted in subsection 7.3.2 is perhaps somewhat exaggerated but also characteristic of that attitude:

> *'Physicians do not attend meetings or they arrive too late. When they arrive, they have not prepared the documents. Sometimes, they open the envelope after having arrived at the meeting.'*

Systems people of both hospitals and also of other hospitals with which discussions were held, affirmed that the interest of medical professionals in system proposals is usually low. They perceive user participation and general discussions about the use of systems in the future as time consuming and sometimes as a waste of time. If they

want systems to support their own work, they want them as soon as possible without many discussions. If others (such as management or IS staff) want to implement MIS or HIS systems, their interest is low during the preparation stages. They react in many cases when systems actually have to be used by them or when decisions have to be made. That makes it difficult to predict the success of the MIS of hospital 1, particularly as it is too simplistic to perceive physicians (or professionals in general) as a homogeneous group. As Scott (1982) stated:

> 'It is important to recognize that no profession is a monolithic group; all represent collections of varying subgroups characterized by differences in their relation to clients, other practitioners, and supporting institutions. Academic physicians, full time physicians who are salaried or under contract to hospitals, and physicians engaged in medical and health care research are among the types of physicians who may be expected to promote the rationalization of health care (p. 217).

Subsection 6.6.7 also suggested that the physicians did not have one fixed opinion about the use of the MIS in that particular case.

8.4   THE ROLE OF POWER

Subsection 2.2.2 describes professionals in terms of interests and power. Various authors (Boreham, 1983; Freidson, 1983; Haug, 1977; Johnson, 1972; Scott, 1982) have emphasised that professionals can (only) be distinguished in terms of power which they already have in society and in the organisations in which they work. The attributes of professionals, as described in subsection 2.2.1 (such as expertise, autonomy, commitment, identification etc.) can be gained by using power and these attributes can also be used to strengthen the power position which they already have. From that perspective, it can be expected that professionals would interpret systems and system proposals in their organisations in relation to the possibility to win or lose power and influence through these systems. They will wonder whether new systems will strengthen or weaken the position and the influence which they have.

The description of the hospitals in chapters 6 and 7 shows that the power and influence of physicians in hospitals can differ and that other groups, such as nurses and management also have their means of power which they use to reach their objectives. Various authors, such as Boreham (1983), Ellis (1987), Fitter (1987), Fogel (1989), Freidson (1984), Markus (1983a), Mintzberg (1983a) and Scott (1982) expect that the advent of computers and information systems in (professional) organisations will affect this power balance. They argue that the use of information systems is not objective but may advance certain interests at the expense of those of others and may consequently cause tensions in organisations.

The case descriptions provide some examples of the argument that many of the systems described do affect power positions of professionals.

1   Many of the local systems in hospital 1 strengthen the positions of the people who use these systems. Incompatibility of these systems makes it hard for other people to influence or control those activities and advances the autonomy of those who use them. From this perspective, system integration is not always an organisation wide objective, but typically an objective of top management and system professionals.

2   The use of the HIS modules in both hospitals requires strong systems management, which is often embodied in an IS department. This explains why these IS professionals try to implement these systems and emphasise the importance of these modules. Gradually, both organisations became dependent on these systems, which explains growing IS departments. The power position of these IS professionals increases, while workers with patients (nurses and physicians) as well as managers are often dissatisfied with these systems. This is another example of an altering power balance through implementation of information systems.

3   The description of the introduction of the management information system in hospital 1 implies important changes in the relation between physicians and managers. Subsection 6.6.5 describes explicitly the expected changes in working

practices, which can be summarised by: more managerial control, less individual autonomy of physicians, more formalised procedures and more external control. This system can be perceived as an unambiguous attempt of higher managerial levels to manage the hospital more tightly and to lessen the professional autonomy of physicians to decide just what they think is the best. Because of the weaker formal position of physicians in this hospital, it is not accidental that such a system will be implemented in this hospital and not in a general one. Morgan (1986) argues that *'the power one already has'* (p. 184) is an important source of power. The management in this hospital has more power than directors of general hospitals, which explains why it can attempt to extend that power.

4   The manner of implementation of the appointments system in hospital 2, as described in section 7.4, is an example of the importance of the use of power by groups of people in professional organisations. The top management cannot decide to implement this system on an organisation wide basis, because they do not have the formal position to do so. The joint board of physicians is also unable to decide about this or to prescribe partnerships or individual physicians about this system. The decision power with respect to this decision is highly dispersed among all the physicians who will be affected by this system and the only way to implement this system is incrementally. The dissemination of power among the professionals explains the manner of implementation. Each individual professional can still refuse to cooperate, in spite of the interests of the organisation as a whole.

These examples illustrate that power positions of interest groups and the dynamics of this are important factors with respect to planning and implementation of information systems.

8.5   RELEVANCE OF TRADITIONAL MODELS

In figure 3.14, alternative information management approaches were evaluated. That figure shows that the many popular approaches (such as BSP, CSF and IE) pay much

attention to the involvement of the top management and the relation with the company policy. One can say that these approaches should fit with the strategic style which Mintzberg (section 8.2) calls 'planned'. Strategic styles such as 'unconnected', 'consensus' or 'ideological' do not agree to a high extent with these information management approaches.

They all have centralistic characteristics which are not close to the practice of hospitals or (according to Mintzberg) many other professional organisations. Hospital 1, with its diversified clusters of systems, serving various and sometimes conflicting interests, shows that a top down approach to system implementation is not the actual situation and is not likely to be feasible or acceptable. Hospital 2, characterised by the independent partnerships, has to deal with the opinions and the cooperation of all the physicians in those partnerships. Implementation of systems will fail if the physicians do not collaborate. This situation makes a political and cultural analysis prior to implementation important. The traditional approaches do not explicitly recommend that attention be paid to these aspects.

These traditional approaches assume that organisations are uniform entities which are (or should be) managed from the top. One can wonder whether these assumptions are close to the practice of professional organisations in general and hospital organisations in particular. Each of the case descriptions shows that information systems have political dimensions and that professionals assess (new) systems from that perspective. They ask whether new systems will strengthen or weaken their position as a professional. Figure 8.10 shows the tension between those approaches and the reality as observed in the hospitals.

	BSP,CSF,IE,stages and Value Chain	Hospitals
(De)centralistic Politics Culture Involvement of users Kind of organisation Paradigm/Observed settings	Centralistic No attention No attention Low attention No attention Uniformity	Decentralised Important factor Important factor Important factor Specific kind Multiformity

Figure 8.10   Confrontation between the traditional approaches as discussed in chapter 2 and the practice of the hospitals

Many hospital managers, physicians and IS people agreed that many IS-concepts which are developed in industry cannot be implemented in a hospital without adaptations. The complexity of the primary process, the high information intensity, the partially conflicting interests of the various parties and the intense human characteristics of hospital processes (physician - patient relations) ask for a specific approach. *'A hospital is not a factory'* is one characteristic quotation of a physician in this context.

8.6   USE OF THE KRAEMER MODEL

The key questions which the states of computing management model of Kraemer et al. (1989) puts forward are: 1) what is the locus of control? and 2) which interests are served by systems? These questions proved to be useful with respect to the analysis of the use of information systems and the field of forces in which these systems have to work in the observed settings. The results of this analysis are reported in the subsections 6.7.3 and 7.5.3. The original model however, urges the user to give one unequivocal answer to two questions:

1 who governs computing? (IS management, users or top management?)

2 whose interests are served by computing? (IS management, users or top management?)

The answers to each of these two questions result in nine possible states of computing (Kraemer et al., 1989. See also subsection 3.4.1). In the cases of the hospitals which are discussed, it was not possible to give unambiguous answers to these questions; the practice of the use of information systems is too complex to put computing in a given hospital into one box. The existing situation as well as the organisational change explains this ambiguity.

Figure 8.11 shows an interpretation of the states of computing in both case hospitals. Hospital 1 can be characterised by changing states: after a dominant role of IS people, the users became aware of the opportunities of systems. At present, the top management also wants to use IT to manage the hospital as a whole. In hospital 2, the IS department and physicians are competing with respect to computer resources, while the top management has been until now relatively a bystander.

One can wonder to what extent these different states can be explained by the learning process with respect to computing, as Nolan suggests (as discussed in subsection 3.2.4; Nolan, 1973, 1974, 1979). The first hospital has more experience in the management of IT resources, and this managerial experience should lead to the Strategic state. Kraemer's work (1989) suggests that not only organisational learning but also other factors such as power positions, influential individuals and the organisational structure are explanatory factors with respect to the state of computing of a particular organisation. This argument seems to be supported by these case studies. In hospital 1 a weakening IS department leads to a lower Skill dimension, while professionals (Service state) and managers (Strategic state) are competing through respectively local systems and management information systems. In hospital 2, the strong formal position of partnerships (Service state) and the expertise of IS people (Skill state) are

competing, while the top management is more or less a bystander through a lack of power and expertise.
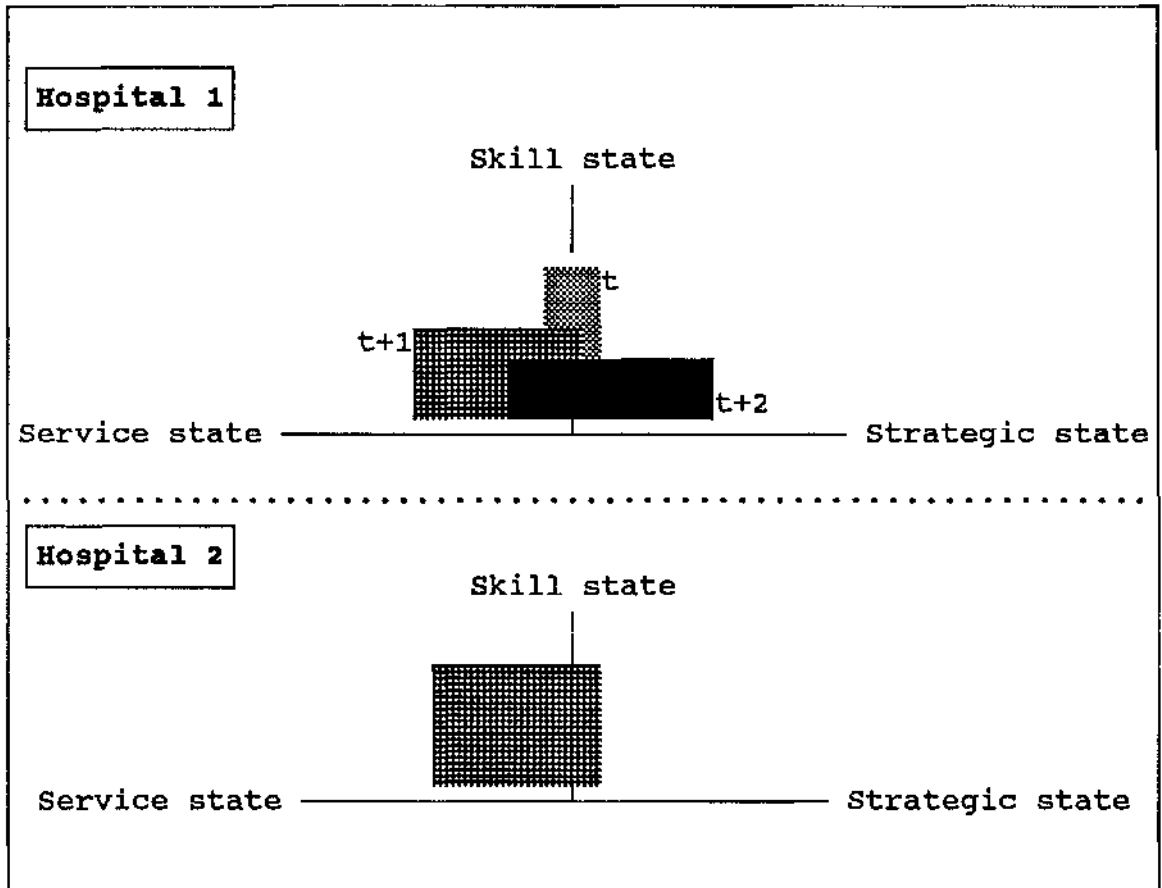
Figure 8.11   States of computer management in hospital 1 and 2 in the terms of Kraemer et al. (1989)

To abstract from these particular hospitals, the Kraemer model helps to diagnose the different emphases and interests of the various groups in organisations. Fitter (1987) makes this more explicit with respect to the interests of the various stakeholders in the health service. He characterises the physicians (so called service providers) as having:

> 'a high degree of autonomy and being relatively free from lay evaluation and control and a service orientation; a commitment to 'look after' the needs and

interests of the client group' (p. 111).

Based on this attitude, the degree to which these people will accept new information technology will depend on (ibid.):

> '1) their perceptions of its effectiveness in improving the service to clients, 2) their perceptions of their ability to use and benefit from technology, and their perceptions of its effect on autonomy, job content and skill requirements and 3) their perceptions of the need to change the current work situation' (p. 111).

Systems which meet these requirements, can be characterised in Kraemer's terms as Service state like. The management of health care institutions should have the purpose to (ibid.)

> 'administer the provision of health services, to manage the services, to set organisational objectives, to monitor activities and exercise control over the operation of the organisation. Cost effective use of resources and reduced labour costs per unit of service is the concrete aim' (p. 111).

Systems which help managers to perform this job are typically Strategic state systems.

Finally, the position of the IS people are characterised by Fitter as follows (ibid.):

> 'the system analyst exercises perspective power and establishes a perspective monopoly by insisting upon and succeeding in the exclusive use of facts, experience, concepts, techniques, and tools are meaningful within the framework of a system perspective' (p. 113).

Fitter concludes that these different groups and forces can lead to different system strategies: 1) *a technology led approach*: try it and see, typically Skill state like, 2) *an improvement in the quality, conditions and autonomy of the work*, typically Service state like, and 3) *an increase in the cost effectiveness of the service*, typically Strategic state like. Fitter mentions one perspective which different groups will share, the improvement in the quality of service. He concludes that (ibid.):

> *'the introduction of information technology into health care is not primarily a technical process, it is a political process bringing about new social relations'(p. 114).*

This opinion corresponds with the starting point of the alternative approaches, as set out in section 3.4.

8.7   USE OF THE PROFESSIONAL - HETERONOMY MODEL

In subsection 2.4.4, a model is put up which is based on various concepts from literature. That model, the Professional-Heteronomy model, provides a means to illustrate how different kinds of organisational change/influence the level of professionalism of a certain professional group which becomes affected by that change and how the role of the management becomes affected by that change. Within that model, four directions can be distinguished: 1) professionalisation, 2) deprofessionalisation, 3) autonomisation and 4) heteronomisation. It is of course possible that a certain change results in a combination of directions. Figure 8.12 illustrates these four directions within this model.

This framework has been used in chapters 5, 6 and 7 in order to interpret certain changes. The changes in health care and the alternative reactions to these changes of hospitals are modelled in chapter 5 (see also the figures 5.2, 5.3 and 5.4). Figures 6.10, 6.11 and 6.12 are interpretations of implications of the use of information systems in hospital 1. Figure 7.4, 7.8 and 7.10 are illustrations of the directions of change which are caused by systems, structures and policies in hospital 2.

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                    PROFESSIONAL
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                  ↑  ↑  ↑  ↑  ↑
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        ←                              →
        ← 4 Hetero-       3 Auto-      →
HETERONOMY ─←─ nomi- ────────── nomi─── ──── AUTONOMY
        ←      sation           sation →
        ←                              →

                2 Deprofessio-
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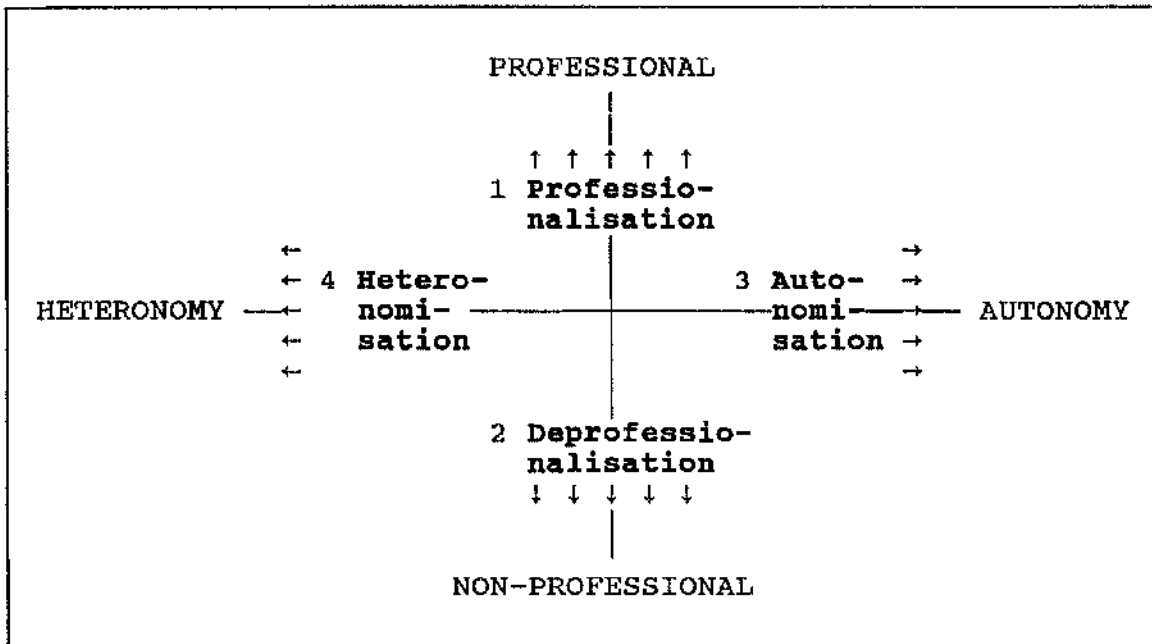
Figure 8.12   *Four directions of organisational change in professional organisations: the Professional-Heteronomy model*

Non IT/IS specific use

In section 5.3 of chapter 5 it is suggested that recent changes in health care have consequences for hospitals. Alternative ways in which hospitals can change and anticipate the developments were illustrated within this model. In this way, the model can help managers, directors and consultants of hospitals and other professional organisations to (re)consider their position. In section 5.3 three alternative directions for hospitals are proposed, 1) continuous heteronomisation - autonomisation battles, 2) the administrators hospital and 3) the physician driven hospital. Each direction will have specific advantages and disadvantages, though these are not further discussed in this study.

IS specific use

Chapter 6 showed that the same model can be used to interpret changes which are

caused by specific information systems and by specific groups of systems. Figure 6.10 showed that many modules of the HIS imply a slight move to heteronomisation, while the local systems are a clear tendency to the opposite direction, autonomisation, according to figure 6.11. It is interesting, and for the people involved revealing, to identify and to point out such opposites in one diagram. The interpretation of the MIS in figure 6.12 leads to fierce discussions among people involved about the implications of the implementation of such a system. Does it lead to deprofessionalisation? Does it imply decreasing autonomy of physicians? What is the new role for non medical managers? In other words: the diagram helps people to discuss (new) systems with each other in organisational terms and in relation to their own work. Using the framework in such a specific way encourages participation of affected groups and forces IS/IT consultants and systems people to render certain system proposals in organisational terms rather than in technical terms. Furthermore, it stimulates discussion which may lead to more understanding of each other's positions and responsibilities.

Use as a tool for diagnosis of IS/IT practice

Figure 7.10 puts various observations with respect to the IS/IT practice of hospital 2 in one figure, in order diagnose this organisation. That figure includes various dissimilar facts which each imply a certain direction in terms of the model. When all these facts are categorised in one figure, they can lead to discussions about the most recommendable direction. Without doubt, the various groups will think differently about this, but the diagnosis brings the organisational facts with respect to IS/IT above the surface. In this case, the hospital mainly moves along the heteronomy - autonomy line which illustrates the competing Service - Skill state as discussed in section 8.6.

Summarising, the Professional-Heteronomy model has been used in different ways in this study:

1) to consider alternative strategies of a professional organisation (chapter 5);

2) to interpret a specific change proposal by a new information system in a professional organisation (chapter 6, 7);

3) to discuss the implications of existing or new information systems (chapter 6, 7) and

4) to diagnose the use of IS/IT in a professional organisation (chapter 7).

Section 9.4 discusses this model more in general in order to consider the potential value of the model apart from these cases.

CHAPTER 9

CONCLUSIONS

9.1 INTRODUCTION

This chapter will bring the various parts of this study together and will articulate conclusions with respect to the study as a whole. Chapter 8, the analysis chapter, focused mainly on the analysis of the data from chapters 5 - 7 and confronted those data with models and concepts from the earlier chapters. This conclusions chapter will include a discussion on whether this analysis of the hospitals taken up in the case studies can be generalised to hospitals and professional organisations in general. In order to do this, section 9.2 will focus on one of the main parts of the analysis, the directions for use of information systems in the case sites. Section 9.3 continues with this theme by paying more attention to the possible usefulness of the Professional-Heteronomy model in other professional organisations. Section 9.4 evaluates the Kraemer model; some additions to this model will be suggested in this section with the intention to improve the efficacy in practice. Section 9.5 goes into the comparison of the Kraemer model and the Professional-Heteronomy model and makes clear which dimensions are covered by both approaches. Section 9.6 discusses the concept of multiform computing on the basis of findings of this study. In sections 9.7 and 9.8, the possible implications of this study for researchers and for practitioners will be discussed.

9.2 TWO DISTINCT POSSIBILITIES

One of the key questions of this study is what alternative approaches can be distinguished in professional organisations with respect to the use of information systems. A consideration of the case studies leads to the suggestion that two directions of use can be observed.

Information systems can primarily be used by the management of professional organisations to increase their insight and to augment their grip on the organisation. In other words: the advent of IT applications influences the characteristics of the (professional) organisation. Figure 9.1 illustrates that possibility through the use of the Professional-Heteronomy model.

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                  ↓          |
                  ↓          |
HETERONOMY ───────↓──────────┼────────────── AUTONOMY
                  ↓          |
                  ↓          |
         deprofessionalisation
                             |
                             |
                    NON-PROFESSIONAL
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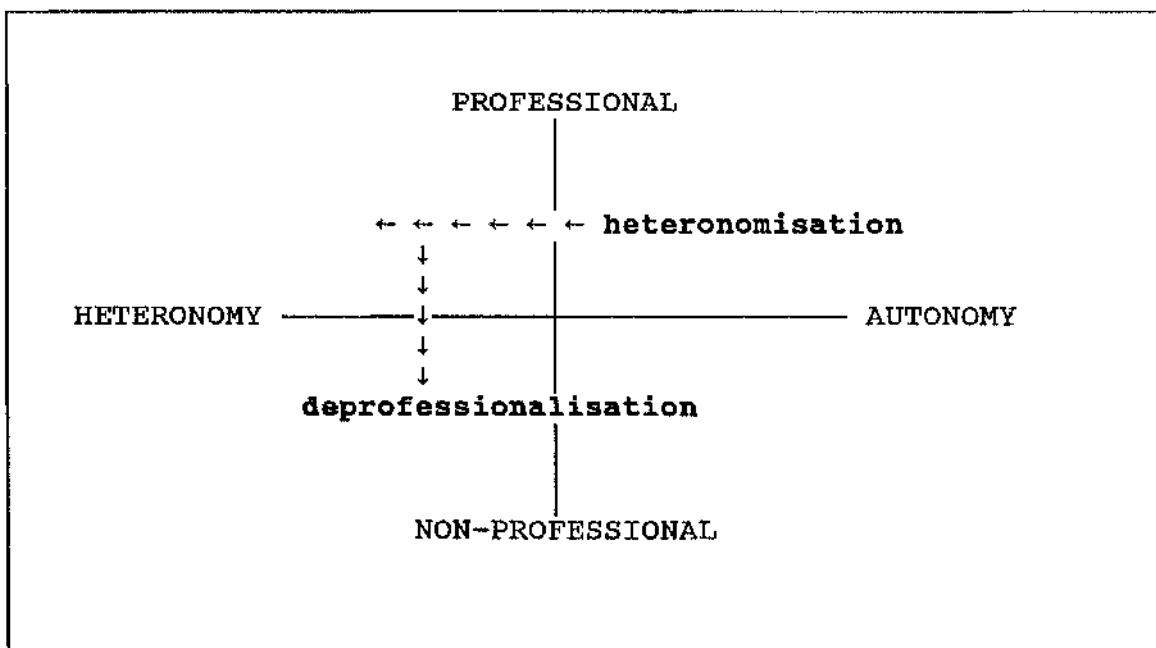
Figure 9.1   *Using IT/IS to advance managerial interests*

This direction of applying information technology can be characterised by an active and participating management, which is able to use information systems to reach organisation wide and typical managerial objectives. Such a way of using IT affects the specific characteristics of the professional organisation: the autonomy of the professionals decreases, which is one of their key features. Within the concept of Kraemer et al. (1989) such a move can be viewed as a tendency towards the Strategic state of computer management.

The second distinct possibility is that means of information technology are used to

facilitate professionals directly. The support of the work of professionals is the primary objective of the application of computer technology. This direction of use can be caused by a conscious managerial action of a particular professional organisation, by the power and awareness of the professionals themselves or as an unconscious development. Figure 9.2 shows that direction through the use of the Professional-Heteronomy model.

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                          PROFESSIONAL
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              → → → → → →↑→ →  autonomisation
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HETERONOMY ━━━━━━━━━━━━━━━━━━━━━┿━━━━━━━━━━━━━━━━ AUTONOMY
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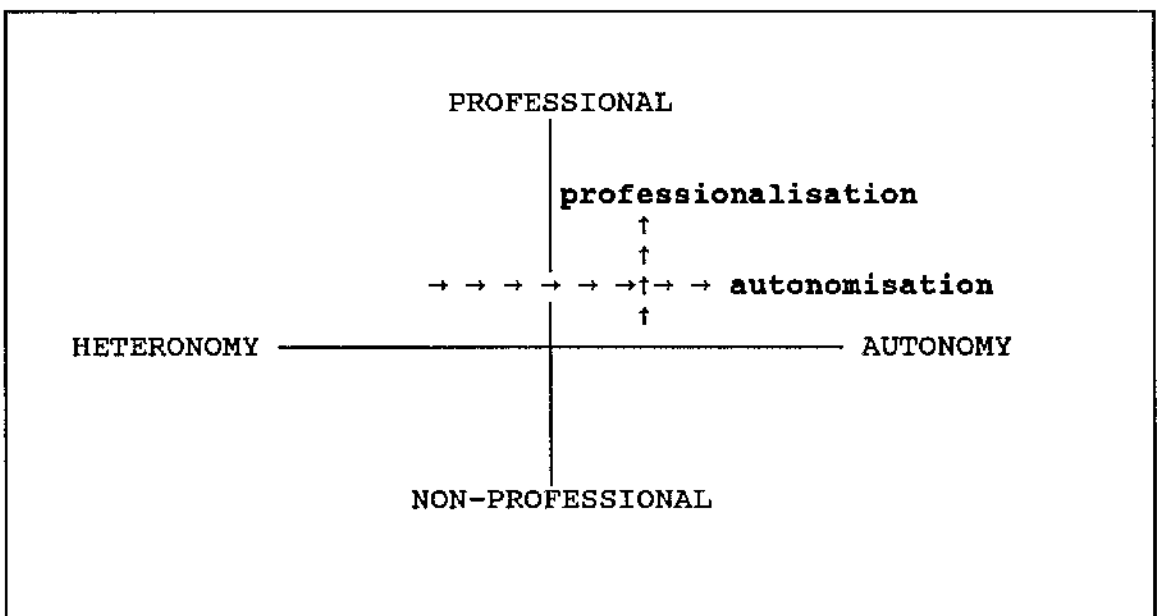
Figure 9.2   *Using IT/IS to advance the interests of professionals*

This alternative comes close to the definition of Kraemer's Service state of computer management (ibid.) as described in section 3.4.1.

Bringing these two general directions together, one can wonder which force is the strongest in a particular case: the tendency of the management to heteronomise and to deprofessionalise which means the use of information technology to change the typical characteristics of a professional organisation or the tendency of professionals to use information technology to increase their level of professionalism and their autonomy in the organisations in which they work. This means that IT is used to

enforce the professional organisation in its key characteristics.

This suggestion agrees with the findings of Van de Velde (1988), who stated that he perceived two partially contradictory but major tendencies in hospital automation:

1 *the administrative or central approach*, which could be characterised by: a direction towards control problems, a focus on management information systems, the processing of large amounts of data and a top down approach;

2 *the medical technical approach or satellite approach*, which he characterised by: an initiation from the medical and nursing processes, dynamics, bottom up and a distributed data processing technology.

These two directions are an outcome of different policies with respect to the adaptation of information technology in organisations. Fitter (1987) observes the same dilemma when he puts the question with respect to the use of information technology in health care of whether *'IT is mainly a practitioner tool or a management aid'*. If there is consensus about the key role of the professionals within an organisation, one can expect that IS applications are developed in close collaboration with those professionals and under control of the profession. Such a way of developing systems should have the purpose of supporting the professionals in their work and making their work more interesting, more efficient, more reliable and more effective. If IT is mainly seen as a management aid, information systems will be used to strengthen the position of managers and to aim to integrate various organisational functions. Deducing from the case studies, a consensus to choose explicitly for one of these directions will not often occur. Depending on the circumstances different outcomes can be expected:

- *a multiform computing arrangement*, where different, apparently contrasting, directions take place at the same time, as observed in hospital 1;

- *a bargaining setting*, where the different parties with their conflicting goals detain the

development of computing, as observed in hospital 2;

- *separate developments*, where the management develops computing without affecting the work of professionals too much and direct computing as much as possible to the peripheral support and staff functions.

Section 9.3 discusses the different directions more extensively, while section 9.6 goes into the concept of multiform computing.

9.3   THE PROFESSIONAL - HETERONOMY MODEL TO UNDERSTAND AND MANAGE INFORMATION SYSTEMS IN PROFESSIONAL ORGANISATIONS

The model as explained in subsection 2.4.4 and applied in chapters 5, 6 and 7 can be used to show in which direction information systems are used in professional organisations. The model can show how a certain organisational change may affect the position of professionals. Since the introduction of computerised information systems is perceived as organisational change, the model can also be used to visualise the impact of information systems on professional organisations. Section 8.7 analysed the various changes observed in the two hospitals in terms of this model. This section will summarise these findings and will add additional examples in order to illustrate the possible use of the model with respect to information systems.

9.3.1   Autonomisation through information systems

The autonomy of users of information systems increases when the systems which they use or develop are not connected with systems of other departments or with managerial or company wide systems. Such systems are often developed by the professional or by his/her department in order to support the exclusive activities of that professional or that department of professionals.

In practice, different ways of autonomisation can be distinguished. Some of these are described below.

1 Autonomisation because of a lack of support

The management of hospital 2 refuses to support physicians and partnerships to develop local systems and connects only terminals on the hospital network. The IS staff is aware of the fact that certain partnerships develop their own PC-applications but refuses to support them. These systems become unconnected and isolated as a logical consequence of such a policy.

2 Autonomisation as a conscious policy to be facilitative and to leave responsibilities to autonomous units

Hospital 1 uses the clear distinction between local (often autonomous, isolated and unconnected) systems and the integrated hospital wide systems. This hospital attempts to follow a conscious policy of devolution and decentralisation (Butler Cox Foundation, 1992) to make divisions, departments and individuals responsible for system design and maintenance of systems which have only a local function. Figure 9.3 illustrates this policy. Such a policy implies that clear arrangements and agreements have to be made among the various affected parties (managers of different levels, systems people and professionals) about the development and use of systems. Such agreements may imply inconsistent or illogical aspects as a result of the bargaining process and will in such a case not always agree with the rational planning methods as set out in section 3.2.
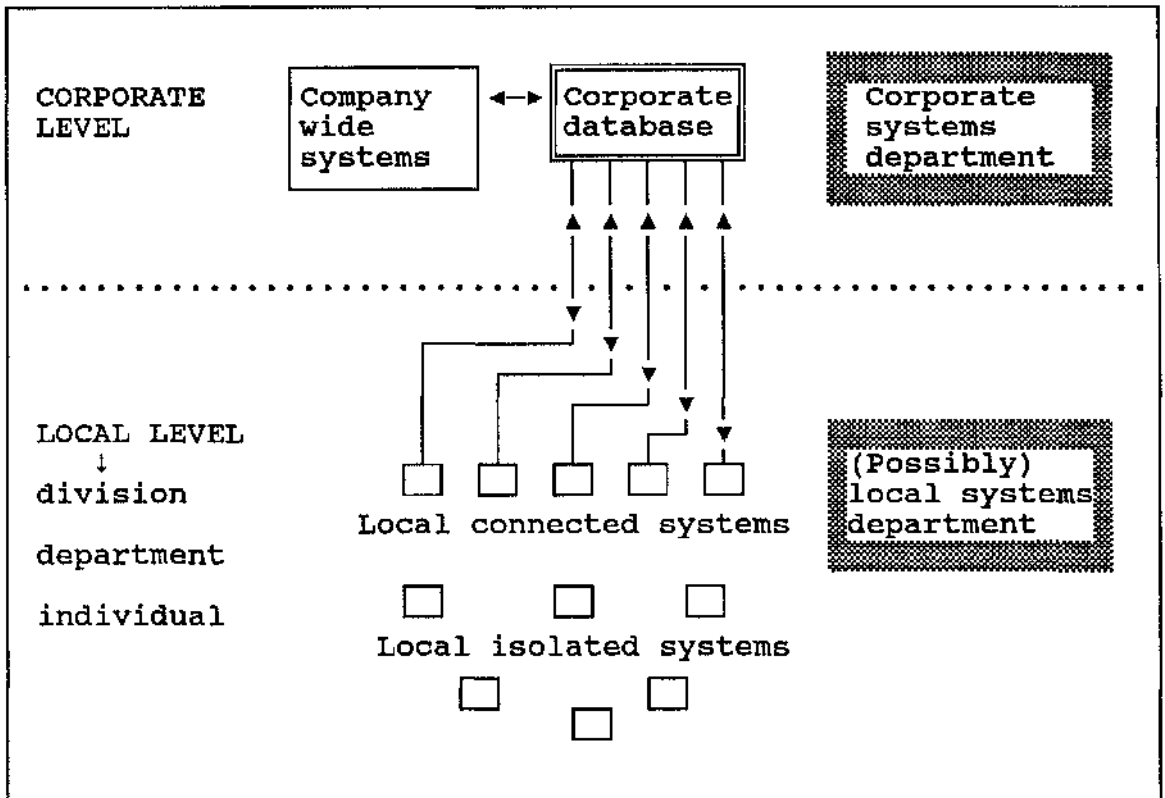
Figure 9.3   *Systems arrangement of global, local connected and local isolated systems*

3 Autonomisation through 'laissez faire'

It may also be possible that autonomous and isolated systems arise through a lack of guidelines, support and facilities. If that is the case, certain professionals will develop, purchase and use their own systems, which will make them more autonomous as a consequence. Unawareness of top management and systems departments may cause such a kind of autonomisation.

Examples of autonomisation

In both case studies there are autonomising tendencies through the use of information systems. In the first hospital the use of many local systems which are not connected with the hospital wide system can be perceived as an example of autonomisation (as

described in section 6.6). It does not seem possible to integrate such systems at a later stage. This also occurs in the second hospital where various partnerships follow their own IS policy and implement and manage their own systems (as described in section 7.3.3). Through that typical partnership structure, it is not possible to manage or guide such developments tightly.

Possible advantages of autonomisation

The systems are often developed in a way which is close to the business processes of the people who perform these processes. People who use such systems can adapt the systems if they think it is necessary to do so. Through the isolated characteristics, these systems do not depend on other systems and may become very flexible and easy to adapt. Users will experience these ways of computing as stimulating and really supportive. It may increase the quality of their work consequently. In the terms of Markus and Robey (1983b, see also subsection 3.4.2), autonomisation may support the existing power division (Power Distribution - System Fit) and the User - System Fit. It may strengthen the professional's feeling of being autonomous and responsible.

Possible disadvantages of autonomisation

The overview of the various processes of the organisation may diminish through such a policy. Cooperation with other departments may cause serious problems through the incompatibility of systems. Autonomisation may mean that professionals with similar problems develop or buy different systems which will result in inefficient use of means. Management will lose control if many business data are stored in unconnected local systems. The professionals themselves can also experience such a direction as inadvisable, because it may hinder them in communicating effectively through IT means with their colleagues. Autonomous and incompatible systems may also be organisationally 'invalid' (ibid.) with respect to the Environment - System Fit. Customers, patients and suppliers can become dissatisfied by the *insular-culture* of the professional organisation.

In which cases may autonomisation be an adequate policy?

Autonomisation policies may be effective if the level of interdependency with other professionals or other departments is low. Increasing levels of interdependencies of various professionals, units and departments as observed in both hospitals, implies that autonomous systems become obstacles in organisational integration.

People who develop and use these systems have to be skilled in the development of systems in an efficient and effective way and should consequently be experienced users. The management has to agree on the consequences of autonomisation, which may imply a decrease of control. If the management believes that professionals have to be managed through interesting work, good facilities and a good atmosphere, rather than through performance measurement, they may think that autonomisation through information systems might be a medium to enforce that management style.

9.3.2   Heteronomisation through information systems

The management of a professional organisation can attempt to increase managerial control through the use of information systems. Systems integration, common use of data, derivation of management information from the operational workflow are examples of heteronomisation. Through the use of information systems, managers may try to transform the organisation into a higher level of effectiveness and efficiency. The management can decide to develop operational systems and monitoring systems in order to increase control over the organisation. They might ask the professional to describe his/her work in a procedural way, they may wish to have insight into the costs of the services of the professionals and they will define the outputs in a more specific way. Professionals are asked to unravel their activities, which enables other people to understand their activities.

Examples of heteronomisation

The implementation of the management information system in hospital 1 is an example of an attempt to make the performance of the hospital more verifiable and measurable. Through the categorisation of patients and treatments and through the developments of treatment profiles and standards, the management attempts to increase its grip on the processes of the hospital. Interesting in that case is the high level of involvement which is needed from the physicians to make a success of that system: it only works when managers as well as physicians make us of it.

The insistence of managers on system integration in hospital 2 is also an example of an attempt towards heteronomisation through information systems. The management allows only system support from the central IS department if the systems are a part of the hospital wide cluster of systems. Local systems which are aimed to support activities of individual physicians are not supported and become isolated. The IS department is in that sense a means of the central management to reach its goals, rather than a service department for the physicians or for other professionals.

Fitter (1987) argues that applications developed by hospital computer services departments have often been direct management aids, developed and installed under the guidance of health service managers. He says:

> 'They are usually based on a formal model of the organization which simplifies
> the realities of day to day work practices. The techniques of systems analysis
> are essentially 'reductionist' and based on a sub division of tasks and a
> standardization of work processes. They may thus be seen as a threat to the
> 'clinical freedom' of doctors' (p. 109).

Beeson (1988) affirms this argument. He observes the danger of an overly strong force towards heteronomisation through management information systems, which may weaken the position of professionals, in this case the physicians. He argues:

> 'the result of these developments is that there are now powerful management
> information products on the healthcare market. But this has prompted a wide-
> spread feeling that the pendulum has swung too far, that from being too
> clinically based, systems are now too concerned with the collection of

administrative information' (p. 42).

This move can work out negatively with respect to the reliability of the management information system concerned. Physicians (in hospitals) and other professionals are still the performers of the primary process and are responsible for the correct input of many systems. If these systems just support the work of managers, the motivation to record the data properly will be low. This problem has been observed in hospital 1 and described in section 6.4. Beeson argues with respect to this problem (ibid.):

> 'if clinicians do not cooperate in the collection of medical information, there is no guarantee that the information will be collected at all or, if it is collected, that it will be reliable. However, clinicians will only use systems that help them in their own work: a system designed just to collect information for administrators represents an additional task for already overworked clinical staff. Systems must lessen the burden of the clinician, not increase it; their role in generating data for administrators must be a by-product of their primary role in assisting those in the front line of healthcare delivery' (p. 42).

This statement may be an important guideline with respect to the implementation of systems which are needed by managers of professional organisations. A low motivation of the professionals to record data properly will undermine the implementation and use of heteronomising systems.

Possible advantages of heteronomisation

Advantages of heteronomisation through information systems have to be seen in the light of external pressures on organisations, the Environment - System Fit, in Markus' terms (Markus et al., 1983b, see also subsection 3.4.2). In the context of hospitals, these pressures are set out in chapter 5. Derivation of management information is only possible in large organisations with the support of information technology: IT gives the management the means to bear the responsibilities which they are expected to have. Without heteronomising systems, it is almost impossible to confront professionals with their performance and to compare them with the performance of their colleagues, inside and outside the organisation. Such systems can also be perceived as a support aid for external stakeholders such as patients, insurers and governments and as a countervailing power towards the power of professionals in general and

physicians in particular. Systems with a heteronomising function will often appear in professional organisations where the various departments or units are increasingly interdependent. (Increasing) interdependencies will lead to more influence for certain levels of management and for integrated systems, in order to manage the interdependencies.

Possible disadvantages of heteronomisation

Many professionals claimed not to be motivated to collaborate with systems implementation of heteronomising systems. Many of them do not see clear benefits for their own work, and that makes them indifferent. Others perceive threats from systems because certain systems may urge them to change their working practices in order to make the system work. The threat of increased managerial control is also a possible demotivator for collaboration with system implementation projects. One physician said in that context: *'in the best case, we provide the system with data, without getting any benefit or feedback'*. Another said: *'IS people have never asked us what we expect from information systems. Managerial needs get priority'*. The Professional - Management conflict approach, which is explained in subsection 2.2.3, can be used to explain these tensions in professional organisations with respect to the arrival of such information systems. Heteronomising systems are examples of the occurrence of such conflicts.

The case study which is described in the article *'Integrated system, autonomous departments: organizational invalidity and system change in a university'* by Noble and Newman (1993), which is referred to in subsection 3.4.2, is a clear example of an organisational 'misfit' in a professional organisation through a heteronomising system. After years of problems, non-use and discussions, the system specifications were altered and the autonomy of users and departments has been recovered.

In which cases may heteronomisation be an adequate policy?

Heteronomisation through information systems will occur through various forces.

1 External forces

Increasing environmental pressures (e.g. from patients, public in general, government, insurers or competitors) may urge the organisation to improve its efficiency, quality or effectiveness of internal operations through heteronomising systems. Hospital 1 (with its HIS and MIS) and hospital 2 with its emphasis on integration are both examples of heteronomisation through environmental pressures. Higher pressures from the environment can imply a tighter internal structure which may have an effect in more external flexibility (Whittington et al., 1994).

2 Internal forces

Figure 8.3 and 8.4 in section 8.2 show two different concepts of the functioning of hospitals. Figure 8.3 shows the concept with the physicians as orchestrator and all the other functions as facilitators, while figure 8.4 shows the concept of a hospital with integrated and mutual interdependent units.

In many hospitals, people such as nurses, laboratory workers and other facilitators become more aware of the importance of their position and no longer accept that they are perceived as just being subordinative facilitators.

Another force is the increasing specialisation of professional work which explains the need for multi-disciplinary teams and the need for integrating managers. These managers may need systems which support them in their integrating role. Other factors which explain heteronomising tendencies are high capital investments (very actual in hospitals) which imply the need for resource allocation and planning functions and an increasing growth in the size of professional organisations (Dawson, 1994), which makes these organisations more complex to manage.

If a professional organisation (e.g. a hospital) moves to the integrated form, this will have consequences for the functioning of information systems. Mutual information

exchange, rather than uni-directed information provisions will be needed. Such internal changes may lead to heteronomising information system policies.

3 Lack of profit responsibility and cost consciousness of professionals

If cost pressures increase, the management of professional organisations will feel the responsibility to determine who causes which costs, how costs develop in time and how costs can be controlled. Information systems which are directed to cost containment will be needed to perform such a task. Many managers of professional organisations expressed the view that professionals do not have an internalised cost consciousness. They are more directed to a proper and responsible working practice than to the consequences of alternatives in terms of costs. Systems which can make (financial) comparisons among e.g. different treatment methods may help to improve that cost consciousness. Heteronomising systems, such as the MIS in hospital 1, have the objective to monitor costs and to report about costs to managers as well as professionals.

Opponents, (often the professionals) argue that such systems limit the operational autonomy, cannot process exceptions because they press new situations in well known patterns and limit progress and change because they are thought out in the past. Many professionals expressed that they feel themselves not supported by budget procedures, time recording systems, logistic systems, processing times and norms.

The common operational systems for the management of time, money, quality and information in the throughput process (like many modules of the HIS in both hospitals) often have a limited effect on the work of professionals. This is because many of these systems are used by people of (staff) departments where routine work is common. These people use these systems without much interference from the various professionals. Another explanation of the limited effect of various operational heteronomising systems on the work of professionals is that professionals do not

appreciate throughput mechanisms and only accept implementation on their particular conditions. The appointments system as described in chapter 7 illustrates this.

Many managers appreciate throughput systems because such systems produce information such as production statistics, financial ratios, budget monitoring outcomes, and they control administrative procedures. With this information they feel that they can control and manage the organisation more effectively and based on hard facts. Weggeman (1992) observed various managerial initiatives in professional organisations ('management point of view') which became translated into system solutions. Figure 9.4 shows these points of view.

Management point of view	System solution	Reaction of professionals
'Efficiency and cost focus operating procedures'	Time recording,	'Bureaucracy'
'Priorities based on market needs'	Portfolio analysis	'Take care for fashion'
'Protect the financial means'	Account systems	'What do marks say? quality is more important!'
'Customers must be satisfied'	Satisfaction examination	'Is it measurable? There are always unsatisfied customers'
'Customer is king'	Participation of customers	'A layman cannot judge the quality of this work. I already work customer directed'

Figure 9.4   *Managers' problems, their system solutions and the reaction of professionals to them (Weggeman, 1992)*

In the third column, the typical reactions of sceptical professionals are represented. The system solutions are all heteronomising proposals, rather than systems which are directed to support the work of professionals.

9.3.3 Professionalisation through information systems

The management of a professional organisation can decide to use (personal) com-

puters which are connected in networks and various kinds of support systems to strengthen the professionals' proficiency. Information systems are -to an increasing extent- able to support professionals in their work. They are able to support processes with respect to data storage and retrieval, presentations, diagnosis, communications etc. These kinds of tools can increase the productivity of professionals and improve their motivation. Yet this approach demands a clear policy on the part of the management: it calls for a plan and it demands considerable investments without clear profits to be calculated. It promotes the process of professionalisation and may decrease managerial influence on the primary process. The thought behind such a strategy is that the management wants to make use of the (expensive) professionals in the most effective way and that it is prepared to surround them with the very best means available. As a result, the motivation of the professionals involved will increase and it is hoped that the quality of the service towards the clients will be improved as well.

In spite of this, certain physicians and representatives of their associations said that the support of their activities through information systems have never been an important objective for many hospitals. In many hospitals, information systems are just perceived as means to make administrative work more efficient. The next step is in most cases to derive management information from those information systems. Local systems as described in chapter 6 and partnerships systems are nearly always initiatives of those particular users.

Ellis (1987) is very sceptical about the feasibility of a clear professionalising policy which is initiated by the management in the context of hospitals. He argues:

> 'and along with that goes a top-heavy administration that survives from one financial or political crisis to another with extreme difficulty. In such a battle ground of bureaucratic manoeuvres, the computer is a godsend for restoring order to chaos, and it is hardly surprising that the administrative side of medical practice has latched on to computers with a good deal more vigour than the professional side'   'one consequence of this imbalance is that the

computer has become further associated with the machinations of admini-
stration, rather than with filling in the gap between the professionals and the
administrators' (p. 120).

A paediatrician (Buller, 1994) argued during a presentation about the consequences
of the use of information systems in health care, that most hospitals follow the
principle *'from information (system) to bedside'*. He pleaded for a reversal of this
principle: *'from bedside to information'*. He argued that the working practice of
physicians and the daily way of working in hospitals should be used as the starting
point for the development of clusters of information systems. Such a direction of
systems use can be characterised as professionalisation. The support of the routines
and activities of the professional becomes the main objective of new systems.

Many professionals argue that it is not easy to acquire such systems. Some of them
said that there is a mental and cognitive difference between IS people and physicians.
IS people should be interested in integration, routinisations, registrations, management
information and control. Physicians are -with respect to information systems-
interested in communications with colleagues and others, an easily retrievable medical
archive and other supportive tools. Those two directions are not easy to integrate into
one common direction.

Examples of professionalising systems are: systems which help professionals to archive
and retrieve their own data, systems which help professionals to communicate with
colleagues inside and outside the organisation, systems which help professionals to
retrieve new information with respect to their profession and systems which help
professionals to produce reports and presentations. Important features of such systems
are user friendliness and free use (not obligated). Markus (1984, p. 30-32) describes
the successful implementation of a system in a large accounting and consulting firm
which made it easier for clients to get into direct contact with their intended party by
telephone.

Possible advantages of professionalisation

The advantages of such a systems use in a professional organisation is that it will improve the motivation of the professionals. They will feel that they are supported rather than controlled and hindered by systems and that IS people and responsible managers try to stimulate them through new technologies. From the managerial point of view, such systems may be useful with respect to the productivity of professionals. The increased motivation may increase the productivity (indirect improvement), but the productivity can also be improved directly because professionals can do their work in a more time efficient way through systems use.

Possible disadvantages of professionalisation

Developers of professionalising systems will often use the working practice of the professionals as a starting point for their activities. This implies typically a bottom up approach. It is questionable if such an approach can lead to a consistent set of systems which should form the basis for deriving management information. Other problems may be the semantic and cognitive gap between system developers and professionals which may hinder the development process of professionalising systems. If professionals develop their own professionalising systems, there is a chance of weakly documented and unintegratable systems, which similarly promote isolation and autonomisation.

9.3.4 Deprofessionalisation through information systems

Heteronomising systems, as described earlier in this section, will often have a deprofessionalising effect since autonomy is one of the features of professionals. But certain systems can have a more direct deprofessionalising effect. Information technology can be used to replace human intellectual processes by software systems. Information technology is not used here as a means to support the professional, but in fact it is going to replace him or her. Such an application may introduce a process of

deprofessionalisation. Among other things, this may involve less skilled employees gradually being put in a position to do the same work with the help of certain software which could only be done by highly trained professionals before.

Fitter (1987), gives an example when he refers to a publication of Hammersley (1975) when he puts:

> 'A computer team at Addenbrooke's hospital in Cambridge was concerned with the less than optimum way that hospital resources were being used. One particular case was the utilization of the operating theatres. The normal procedure was for the surgeon responsible for an operation to book the theatre for as long as it was anticipated would be necessary.
>
> Analysis of data revealed that an operation booked for four hours took on average 192 minutes with a standard deviation of 90 minutes. Using the techniques of operations research the team discovered that, based on the characteristics of individual surgeons and the type of operation to be performed, it could predict more accurately than the surgeon how long an individual operation would actually take. Since more accurate predictions would save money (more operations carried out in the facilities available, and less overtime payments to technical staff, paid when operations overran) it was proposed that these management techniques be used in the allocation of resources.
>
> Perhaps not surprisingly the surgeons objected, arguing that the decision was necessarily one of clinical judgement, requiring that many additional factors be considered when allocating theatre time. In the event the proposed system was not implemented' (p. 107-108).

This example shows that systems may have the capabilities to take over parts of the tasks from professionals, which causes a narrowing effect on their work and a lower level of responsibility in these tasks. Another example of deprofessionalisation through systems is an expert system of an insurer which is able to judge insurance applications and to determine the insurance premium. This expert system replaced many of the assurance experts (Computable, 1992). Legal expert systems may also have deprofessionalising effects. The proceedings of the International Conferences on Artificial Intelligence and Law (e.g. those of 1989) describe various examples of such systems, such as a system which gives guidelines for sentencing (Simon, 1989) and a

latent damage system (Susskind, 1989). Leith (1986) expresses his deep scepticism about the possible usefulness and the desirability of legal expert systems.

Possible advantages of deprofessionalisation

Saving costs will often be an important reason to develop systems which have replacing or deprofessionalising consequences. Salaries of professionals are often a relatively high part of the costs of professional organisations; these high costs are often important incentives for managers to look for less expensive solutions to get a comparable result.

Another important incentive may be a more consistent and reliable output. Professionals often work on an individual basis and do their work with varying efficiency and effectiveness. Certain managers of professional organisations, but also society in general regularly demand more consistent outcomes. E.g. judges are often criticised for giving different punishments for the same criminal offenses. A typical example of such a discussion took place on 1 November 1992 on Dutch television during a debate between a judge and a critic. They discussed -among other things- the desirability of formalisation of the work of judges and the whole legal system. Some of their remarks are paraphrased below:

Critic: *'It is imaginable that a judge uses a computer program which uses as input some objective facts about a delict, e.g. the use of violence (y/n), attempting to use violence (y/n), amount stolen etc. and presents as output some comparable cases and the verdict given in these cases. This will give him a clear guideline for arriving at a judgment'*

Judge: *'Personal circumstances of the suspect are not considered in such cases and it affects the autonomy of the judge to develop his own independent and objective judgement'*

Critic: *'Such a system -which could be realised from a technical point of view- makes the work of different judges and from judges in different regions easier to compare and improves legal security for the people. The lawmaker also gets more insight into the actual relation between criminal act and punishment and the one intended'*

Judge: *'Of course judges have card-indexes which could give indications about the punishment, but these data are only intended for personal use. A system such as you propose diminishes the importance of different personal circumstances of suspicious persons and mechanises judgments. Judges are there to weigh a case'*

The critic refers especially to the technical capabilities to formalise the work of a judge and to the advantages for clients and society (legal security). His opponent, however, emphasises the attack on the autonomy of the judges, and the impossibility of supporting the work of judges in that way. The critic might call this mystification.

Possible disadvantages of deprofessionalisation

Leading professions, like medicine and law, will resist attempts to replace or to routinise parts of their profession. When the power position of professions is strong, much resistance against such systems can be expected, as discussed in subsection 2.4.1.3.

Beside these societal and organisational problems, another possible problem of deprofessionalising systems is the supposed technical complexity. Not many unarguable successes are reported from this field, where systems take over major tasks from occupations with intense human characteristics. Professionals are also described in subsection 2.2.5 as having close interaction with their clients (e.g. patients, demanders of advice, patients) and this human interaction is not easy to replace. Possible examples are hospital 1 where systems are used to control emergency calls and systems which can ask relevant questions of people with certain psychological problems (see section 6.5).

9.3.5 Heteronomisation and professionalisation through information systems simultaneously

In hospital 1, the physicians become co-responsible for financial aspects, as an attempt to escape from the dual organisation. Professionals get extra responsibilities and

become involved in managerial issues and macro considerations. This can be perceived as an *'escape from the dual organisation'* (Tap and Schut, 1987). In the traditional professional organisation, there is a duality between the administrators and the professionals. This duality is conceptualised in the Professional - Management conflict approach as described in subsection 2.2.3. By making professionals more responsible for administrative matters and by making managers more involved in the dilemmas of professionals (e.g. medical dilemmas), an attempt can be made to avoid this conflict (Dawson, 1994; Fogel, 1989; Reed, 1985). This can be seen as a simultaneous move to professionalise and to heteronomise. Information systems can support such a direction. Kuin et al. (1990) suggests with respect to such systems:

> 'One of the more radical consequences is that decisions have to be made earlier at lower levels in the organisation. Medical and nursing professionals become the budget manager. Beside the normal tasks of such professionals, they become responsible for the tuning of production, budget control, scheduling of personnel and quality control' (p. 20).

It can be wondered whether many professionals (and certainly physicians) are willing to become co-responsible for organisational matters (see section 7.2.3).

9.4 THE KRAEMER MODEL COMPARED WITH THE OTHER DISCUSSED APPROACHES

One of the central conclusions of the research of Kraemer et al. (1989) is that *'management matters'* with respect to information systems. They oppose approaches like that of Nolan (1973, 1974, 1979, see also subsection 3.2.4), where the most powerful driver of change in computing is said to be technological advancement, as a component of the larger environment. That changing technology should blow into the organisation as changing weather. The Nolan model assumes that new technology comes into an organisation, catches on as a popular activity, grows rapidly, causing top management concern, is controlled through the actions of rational managers, and eventually finds a mature position in the organisation. That state occurs when

computing is efficiently and effectively applied to organisational needs.

The argument of Kraemer is that management action and actions of other parties within the organisation determine the way of using information systems. Unlike many stages models, which predetermine where an organisation ought to be given various factors, the model of Kraemer suggests that computing outcomes are a matter of (managerial) choice, politics, negotiations and coalitions within the organisation.

These findings are supported by this study. Systems use in both hospitals are final outcomes of managerial action, involvement of different and sometimes opposing parties, typical organisational characteristics and bargaining processes. The set of systems of both hospitals as well as the system development initiatives are products of what Kraemer et al. (1989) call *'political allocation mechanisms'*. Kraemer distinguishes in this light *technocratic elitism* (a force which is directed to the Skill state), *organisational pluralism* (a force directed to the Service state) and *managerial rationalism* (a force directed to the Strategic state). The strength of those forces determines the final outcome of this process.

The Kraemer-model recognises the existence and influence of the external environment but concentrates on the means by which resources for computing are allocated by a political system, which represents that portion of organisational management involved with computing. The taxonomy which they have developed (see subsection 3.4.1) provides a method for mapping computing change in an organisation and helps to diagnose the current state of computing management in an organisation. Figure 9.5 compares the approach of Kraemer et al. and the Professional-Heteronomy model with the approaches as described in section 3.2 by a model of organisational change.

Model	Environment		Action	Outcome
	External	Internal		
BSP (3.2.1) CSF (3.2.2) IE (3.2.3) Value Chain (3.2.5)	Rational analysis of the internal and/or ⟶ external processes		Rational management, deliberate action ⟶	Applications Policies Plans and
Stages approach (3.2.4)	Technology change + Knowledge	→ Skills ⟶	Rational ⟶ management, Organisational reaction	Use
Kraemer's states of computing management model (3.4.1)	(implied) ·····>	Political resources ─ allocation system		Use 3 congruent states 6 mixed states
Professional - Heteronomy model (2.4.4)	New technologies →	Policies + ⟶ politics	Multiform management, Policy	4 general directions of use

*Figure 9.5   The models of Kraemer et al., Professional-Heteronomy, Stages, BSP, CSF,
IE and Value Chain compared in terms of environment, action and
outcome according to a model of change (source of that change model:
Kraemer et al. (1989)*

This figure shows the differences of the common approaches towards information
management which are explained in the subsections 3.2.1 - 3.2.5 on one side and the
Kraemer and the Professional-Heteronomy model on the other. The first group of
approaches supposes a rational management which determines the direction and the
way of using information systems. Within these approaches, the stages approach
suggests that technological change and skills are critically important; the other
approaches suggest that a rational analysis of the internal and/or the external
environment leads to applications, policies, plans and use of systems.

In contrast to this, the Kraemer model and the Professional-Heteronomy model suggest that political and cultural factors inside the organisation determine the way and the direction of computing. Such political and cultural factors can be influenced and be triggered by external developments such as new technologies or non technological pressures like increased budget pressure or competition. Both models are applied within the case studies and proved to be useful aids to analyse, to explain and to guide computing in professional organisations.

9.5   A COMPARISON OF THE KRAEMER MODEL AND THE PROFESSIONAL - HETERONOMY MODEL

This study uses the Kraemer model and the Professional-Heteronomy model extensively to analyse the case studies. After the discussion of these models it is useful to make a comparison of both approaches in this conclusions chapter.

Similarities of both models are:

- both models perceive organisations as multiform entities. Using the categorisation of Burell and Morgan (1979, see also section 3.3) both approaches can be placed in the subjective/conflict box;

- both models can be used to explain support and resistance with respect to IS policy in general and system proposals in particular;

- both models identify certain interest groups and their particular interests in relation to organisational change in general or to computing in particular;

- both models are not normative but are developed to diagnose and to analyse consequences of states of computing or IS proposals in order to improve the insight into these organisations.

Differences between the models are:

- the Kraemer model focuses exclusively on the management of computing while the Professional-Heteronomy model can also be used to analyse possible organisational change in general;

- this implies that the Professional-Heteronomy model can be used to explain the impact of information systems in terms of organisational change;
- the Kraemer model is not developed for a specific kind of organisation, while the Professional-Heteronomy model is especially applicable in professional organisations. This can also be perceived as a limitation of the Professional-Heteronomy model: it interprets change in just these two dimensions;
- the Kraemer model can be used to categorise a certain state, while the Professional-Heteronomy model is designed to categorise change.

To summarise this, figure 9.6 compares both approaches within the dimensions 'Static - Dynamic' and 'Computing - General'.

Dynamic,
developed to interprete organi-
sational consequences of change

Computing ———— KRAEMER —————————— General
MODEL

PROFESSIONAL -
HETERONOMY MODEL

Static
designed to identify a state

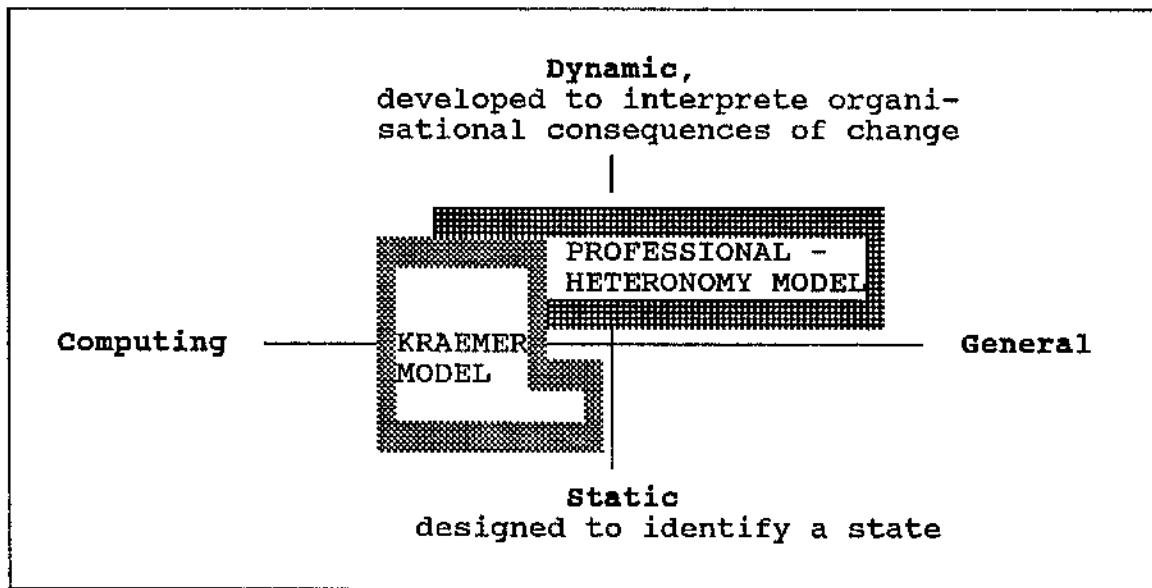*Figure 9.6   Differences and similarities of Kraemer's model and the Professional - Heteronomy model*

A dynamic model is specifically designed to show directions of change, while a static model is designed to represent a current or a prospective situation. A computing model is specifically designed to diagnose computing in organisations, while a general model can (also) be used to diagnose other dimensions in organisations.

9.6   MULTIFORM COMPUTING

Kraemer suggests that the 'political allocation system', where various forces play a role, determines the outcome with respect to computing. This is in contrast with the other approaches such as BSP, CSF, IE, Stages and Value Chain Analysis, where a managerial and rational analysis determines the final information systems policy. The Professional-Heteronomy model suggests the same as Kraemer: information systems move the organisation in certain directions, which are supported by certain groups and probably opposed by others. The analysis of the case studies showed that these party models are useful with respect to the explanation of computing decisions in professional organisations.

The central idea behind both approaches is that (professional) organisations are essentially multiform entities where different groups follow their own policies in order to reach their particular objectives. Morgan (1986) states:

> 'much organization theory has built on the assumption that organizations, like machines or organisms, are unified systems' 'The political metaphor suggests otherwise, pointing to the disintegrative strains and tensions that stem from the diverse sets of interests on which organization builds' 'Many organizations have the characteristics of loosely coupled systems, where semiautonomous parts strive to maintain a degree of independence while working under the name and framework provided by the organization' (p. 196).

Relating this idea to computing, this means that the practice of computing in professional organisations is a reflection of the relative power of the various groups (like management, professionals, IS-management and staff people). Scott (1982) also discussed pluralism in organisations:

> 'This means that there are multiple centers of power. The organization does not wholly absorb professionals, nor do professionals wholly absorb the organization. To the extent that a system of relations is pluralist, it tends toward a balance of freedom and power or, in functional terms, between the conditions conductive to creativity and those conductive to control' (p. 232).

According to this idea, computing in professional organisations will be a temporal

outcome of a bargaining process rather than a rational and consistent planning process. A conscious policy of multiform computing should be characterised by a number of features:

- the readiness of professionals, managers of professional organisations as well as IS-people to admit each other's responsibilities and interests with respect to computing as much as their own;

- real negotiations about systems choice and specifications;

- the acceptance that the outcomes of computing decisions are not necessarily consistent and purely rational; more democratic than dictatorial (Morgan, 1986);

- to use global planning methods (the so called *zoning plan approach*) rather than making blueprints, as methods like BSP (subsection 3.2.1) and IE (subsection 3.2.3) suggest;

- a conscious and similar use of different kinds of information systems. Some systems will strengthen professionals in their proficiency while other systems or other system parts may support managers in order to enforce their responsibilities;

- an incremental approach (Keen, 1981) in realising certain system objectives rather than agreeing on long term objectives and blueprints.

Such a multiform computing strategy has also been suggested by Markus and Robey (1983b) when they explain their organisational validity concept (see also subsection 3.4.2). They plead for 'an attempt to integrate different interests' *and* for 'negotiations among different interests' (ibid., p. 218). They argue:

> 'Issues of politics, power, and negotiations have been generally neglected in the management literature, which has chosen to focus on integration of differences. However, exclusive examination of the integration strategy can blind us to negotiation strategies that occur simultaneously in MIS development' (p. 219).

Figure 9.7 brings various elements of the analysis of the case studies and the models which are used together. The upper part shows that various environmental and institutional factors of professional organisations influence the strategic style and the practice of decision making in these organisations. These three components (environment, institutional factors including the strategy) determine the practice with
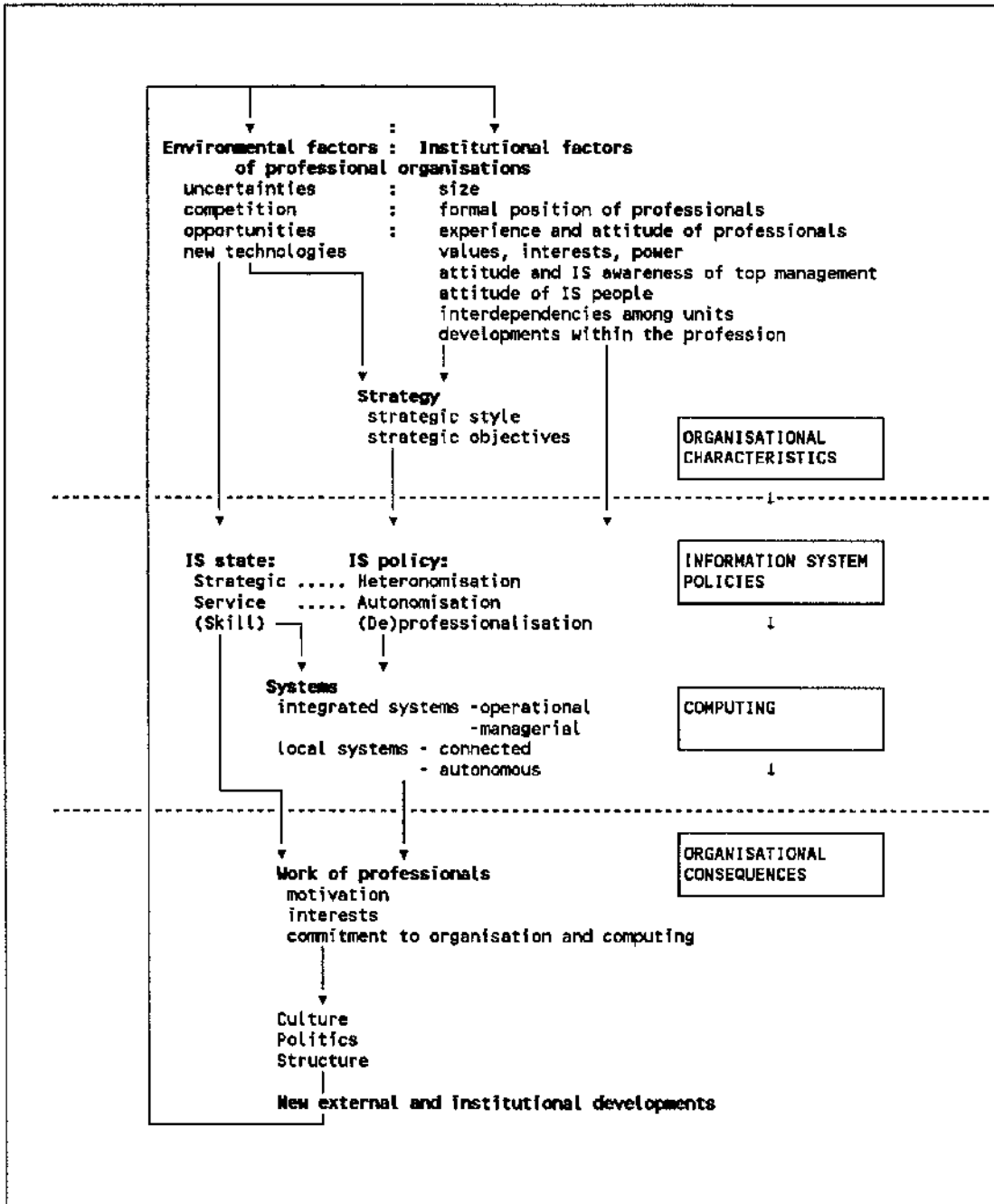
Figure 9.7   Various elements of this study brought together

respect to computing: the state of computing, the IS policy and the kinds of systems

which are used. These systems influence in their turn the work of professionals: their motivation, interests and commitment. In the longer run, this can influence the culture, the politics and the structure of a professionals organisation (these are the institutional factors). These influenced institutional factors make a circular process of computing. Changed institutional factors and changing environments may create space for other computing arrangements.

9.7 IMPLICATIONS FOR FURTHER RESEARCH

The choice of case study research and a grounded theory approach, which is discussed in chapter 4, has specific aspects. It can provide certain new insights or can lead to new models or ideas. As the founders of Grounded Theory suggest (Glaser and Strauss, 1967), this approach generates more hypotheses and ideas, than actually testing them. Two major outcomes of this study are the usefulness of the Kraemer model with respect to the diagnosis of computing in professional organisations and the Professional-Heteronomy model as a means to analyse and discuss the current and prospective IS policy in a professional organisation. Many other suggestions and observations are articulated in the final sections of the case studies and in the analysis and conclusions chapters. Characteristic of this study is the relatively broad approach, which perhaps leads to new, more focused research questions. Some suggestions are: 1) to deepen the insight into one kind of computer use in a certain kind of professional organisation, 2) to broaden the insight to other kinds of change in professional organisations, 3) to broaden the professionalisation-concept to other kinds of organisations (eventually with respect to computing) and 4) to elaborate multiform computing as an alternative concept. Each of these suggestions are elaborated below.

1 Deepen the insight into one kind of computer use in a certain kind of professional organisation. This study focuses in a relatively broad and general way on the IS-management in professional organisations in general and on hospitals in particular.

Various alternatives of the use of information systems are distinguished. It could be of interest to focus further studies on more specific ways of using information systems in (certain) professional organisations. An example of such a study could be directed to the evaluation of the use of management information systems in hospitals. Many hospitals use such systems with the objective to increase managerial control or to support physicians to manage their own departments in a more informed way. It is relevant to wonder whether such systems reach their initial objectives and to what extent they really affect the work of the physicians who are involved. An elaboration of each possible alternative in the terms of the diagram of the Professional-Heteronomy model could deepen the insight into the impact of systems in professional organisations. Such research could be directed to a closer look at kinds of systems as well as at kinds of (professional) organisations.

2 Broaden the insight to other kinds of change in professional organisations. The Professional-Heteronomy model as developed throughout this study has been used as a framework to qualify information systems in professional organisations. However, the terms which are used in the diagram are not exclusively directed to the use of systems; it might also be possible to qualify other kinds of organisational change in professional organisations (e.g. restructuring projects, rationalisation projects) with this framework. It could be interesting to qualify certain cases of change in one professional organisation with the use of this model in order to analyse and explain the field of forces around such change processes (e.g. in the case study which is described in the article of Hinings et al., 1991).

3 Broaden the professionalisation-concept to other kinds of organisations (eventually with respect to computing). Organisations which are not generally qualified as professional organisations may have certain characteristics of professional organisations, since many people perceive the attributes of professionals as attractive. This may explain that the implementation of information systems as well as other kinds of

organisational change will also be interpreted by many users in the continua deprofessionalisation - professionalisation and heteronomisation - autonomisation. Not only professionals but also other people appreciate changes which make them more responsible for their own work which is an aspect of professionalisation. People will adapt systems easily which support their work, while they will resist systems which may replace them or which control them more tightly. However, the question will be whether they are equally effective as professionals in resisting such systems.

4 Multiform computing as an alternative concept. The idea of a conscious multiform computing policy, as explained in section 9.6, could be investigated further to understand it in more detail. It might be of interest to work out that concept and to put it as an alternative concept for information systems planning.

9.8 IMPLICATIONS FOR THE PRACTICE OF INFORMATION MANAGEMENT IN PROFESSIONAL ORGANISATIONS

One of the aims of this study is to generate insight and guidance for practitioners in professional organisations: managers, IS people as well as professionals. The managements of professional organisations are not always aware of the effects of computing on the characteristics of their organisation. Some of them still regard computing as a low level support function which can be delegated to subordinates, while others try to copy computing successes from industry in their own professional organisation. Both approaches will not be very successful, the first because the organisation may miss important benefits of computing and because it may cause problems between IS-people and professionals and the second because many IT-applications affect the work of professionals, which can imply that professionals follow their own policies and may resist.

The question facing *managers* of professional organisations is how to apply IT in a

sensible and effective way in their own organisation. This study shows that there is no recipe for this, but awareness of different directions of use and states of computing will strengthen arguments and make choices more conscious and well considered.

The managerial choice with respect to computing in professional organisations may change the basic characteristics of the organisation. On the other hand, it can be argued (based on this study) that these basic characteristics of the organisation may also influence the choice of systems. A main choice to strengthen and motivate the professionals in a decentralised organisation leads to computing decisions with autonomising and professionalising outcomes; these are decisions with Service state characteristics. The choice to strengthen the position of the management and to improve the overall insight in the operations of the organisation leads to computing decisions with heteronomising and eventually deprofessionalising effects; these are decisions which may lead to the Strategic state. Figure 9.8 shows these two possibilities.

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┌─────────────────────────────────────────────────────────────────┐
│                                                                   │
│              ┌──────────────────────────────────┐                 │
│              │     Information Systems           │                 │
│              └──────────────────────────────────┘                 │
│                        ▲                │                          │
│                        ┊                │                          │
│          may influence              may change the                │
│          the use of                 characteristics of            │
│                        ┊                │                          │
│                        ┊                ▼                          │
│              ┌──────────────────────────────────┐                 │
│              │   Professional Organisation       │                 │
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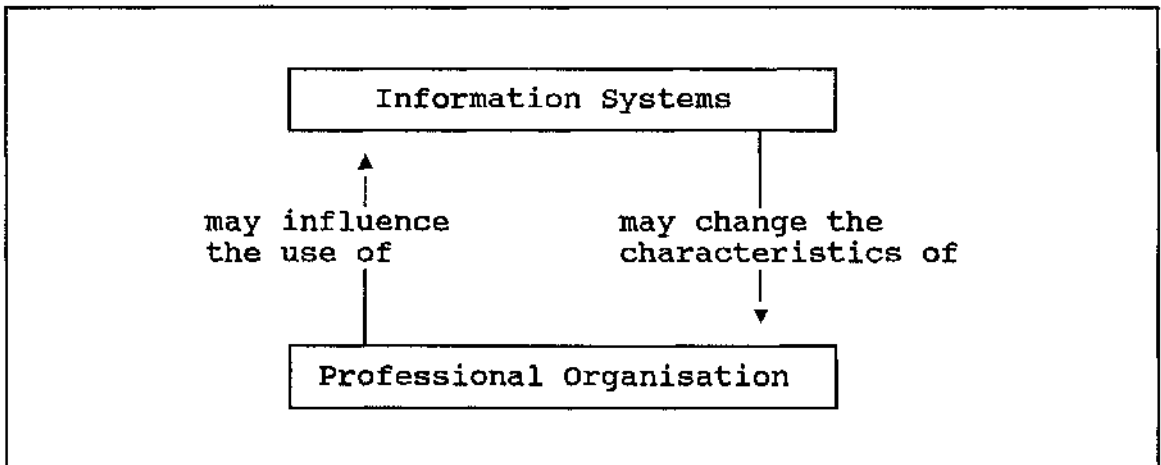
Figure 9.8   Reciprocity between information systems and professional organisations

New opportunities of information systems may change the professional organisation, but the specific characteristics of the professional organisation may influence the way of using information systems as well. In other words, the management of professional

organisations should ask themselves how they want to organise the information provision and the use of information technology and which attitude they want to adopt in their contacts with professionals in this field. On the basis of this study, different options do arise.

The first option could be to implement systems which register and formalise the work of professionals to a high extent. This would be a development towards a heteronomous professional organisation with a lot of managerial influence on the primary process. The strategic question behind this is whether the management wants the organisation to grow in the direction of co-ordination, integration and centralisation, or in the direction of autonomy, creativity and decentralisation. These opposite directions can be stimulated by the way the information and automation policy are to be carried out in relation to the professionals.

A second option could be to strive for systems which support and motivate the professionals and which increase their possibilities. That would imply a growth towards an autonomous professional organisation with the management creating primary conditions.

Referring to section 9.2 and 9.3, the two distinct possibilities as set out in 9.2 and the model as a whole in 9.3 may help managers to determine which direction they think is most appropriate in their organisation. Figure 9.9 summarises these contrasting policies into more operational terms. Based on these extremes, managers of professional organisations should choose which direction they will follow in their concrete situation. A multiform computing arrangement, as set out in section 9.6, could be a kind of a compromise or a middle strategy between these contrasting options.

Derived from these choices, the *IS staffs of professional organisations* should determine

their policy. Central questions are in that case: 1) who is our customer? and 2) what are our objectives? If their organisation follows a policy which is according to the right column of figure 9.9, the IS staff will be faced with different new dimensions of their work. Among these can be mentioned:

1) they will need project management (Boddy and Buchanan, 1992) and negotiation skills (Markus, 1983a) in order to deal with contrasting opinions and discussions about system specifications;

2) they have to become familiar with the characteristics of the multiform organisation and a multiform IS policy;

3) they should follow an incremental progress based on a destination plan rather than on a blueprint of prospective systems; this should become a desirable rather than an undesirable and possibly frustrating aspect of their work and

4) they will need more awareness and expertise of the primary process of the organisation in order to support these processes in the best way.

IS policy method/approach	
Centralised approach, top down	Decentralised approach, bottom up
Grand plan	Incremental development negotiations, attention for various interests
Business led, strategic use	Organisation directed
Directed to heteronomisation and eventually to deprofessionalisation	Directed to the support of professionals Emphasis on multiformity
IS for change	IS for support
Attitude of IS staff	
IS staff perceives (top) management as their primary customers	IS staff perceives professionals as their primary customers
Implications for systems	
Management information systems Monitoring and control systems Emphasis on integration Systems which have the objective to improve contacts with clients and external stakeholders	Local systems, end user needs Emphasis on support Unstructured communication systems Acceptance of autonomous systems

Figure 9.9   *Contrasting approaches of managers of professional organisations towards information systems*

Finally, *professionals* have to become more aware that the advent of systems in their organisations and the developments in information technology have the potential to affect their position as professionals from many perspectives. The case studies as well as the chapters 2 and 9 have illustrated that extensively. It has -among other things- the potential to affect the current power position of professionals, to affect their

relations with managers through heteronomising systems and to disperse their expertise which may diminish their generally respected position as professionals (the demystification argument).

On the other hand, information systems may help them to strengthen their position and to make their work more interesting. It may improve the quality of their work and augment communications with colleagues inside as well as outside their own professional organisation. Besides, it can help them to update their expertise. All these aspects may be arguments for professionals to intensify the attention in the developments of information technology in their daily work, in their organisation, and in their profession in general.

9.9 SOME FINAL CONCLUSIONS

The main question of this study is whether the characteristics of professional organisations influence the use of information systems in such organisations. This study shows that the specific position of professionals within such professional organisations can affect the use of information technology. For example, they may resist systems which aim to pattern and control their work and they may try to develop their own IT based working environment.

Because of this, management of such organisations should be aware of these 'autonomous' professionals and should take this into account during the development and implementation of an IS policy. This conclusion can be extended to 'non-professional' organisations which employ specific groups of professionals, for example in R&D departments. The introduction of information systems there may result in similar reactions and considerations amongst those professionals.

This study argues that professionals cannot be perceived as a clear, discrete and

always distinguishable kind of employees; professionalism is rather a set of features which are possessed by many workers to a higher or a lower extent. This means that the attitude which professionals may have towards systems will also be experienced by other people who are not commonly perceived as 'professionals'. The question is whether those people will be as successful as professionals in realising their objectives with respect to the use of systems.

Being a 'professional' is not a static position. This study shows that the move to '(de)professionalisation' is commonly occuring, as well as the moves which are called 'autonomisation' and 'heteronomisation', which also affect the position and the work of professionals. This means that various factors, including the successful implementation of information systems can change the position of professionals. A number of examples in this study also show that the successful implementation of information systems may affect professional organisations in their basic characteristics and may change them in the direction of other kinds of organisation.

The changes in the position of different interest groups following the implementation of information systems, explains that the Kraemer model is a worthwhile instrument for analysis (Kraemer et al., 1989). This model is directed to the question of whose particular interests are served by systems; this is a question which is not asked by many other approaches. Traditional approaches perceive organisations more as homogeneous units, with common goals rather than as pluralistic institutions with diverse objectives. This study has built on the assumptions of the Kraemer model; suggestions are given to make it easier to apply in a concrete situation. The original form of the model suggests that there can be one state of computing in one period; this research suggests that a mix of different states of computing (which are partially inheritances of the past) may occur at the same time in many organisations.

Many approaches assume that the information resources can be managed similarly in

different (kinds of) organisations. This study suggests that one specific kind of organisation -the professional organisation- is different and consequently needs a different information management approach. Extending this argument, one can argue that information management models are needed which take the kind of organisation into account in a more conscious manner. Broader acceptance of this conclusion may lead to contingency models of information management. Such models should guide managers in their information management, while respecting the specific characteristics of their organisations.

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