

# 1. Introduction

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## INFORMATION SYSTEMS AND ORGANIZATION

Information Systems and Information Technology (IS/IT) are becoming ever more infused, absorbed, integrated, appropriated and diffused into or by organizations, creating a host of contradictory impacts. IS/IT are responsible for delayering and relayering of organizational structures, for deskilling and upskilling of personnel, for more autocratic and more participative management styles, for breaking down and for erecting organizational boundaries. In a nutshell, the information age or the knowledge era with all its confusing promises, expectations, myths and consequences is here to stay and presents a new wave of challenge to people, society and organizations.

At the same time, more than ever before, we live in a world of organizations. From the growth of the internet to the mounting complexity of world politics; from the increasing use of air travel to the renewed struggle against world poverty; from the busy construction of a United Europe to the world race on the vaccine for AIDS and other plagues, all we see around us are organizations emerging, forming, changing and dying at an impressive speed. In an increasingly complex world, the endeavour for the survival of the human species has to be organized and managed. But how to organize and how to manage appropriately and effectively in the new age? What drives the so called 'new economy'? How to make sense of the new mix – IS/IT and the organization?

This book is about information systems and information technology (IS/IT) in the context of organizations and their management. It is a multi-disciplinary approach which characterizes many of the so called 'new' disciplines in both the hard physical sciences and the soft social sciences. In our case, information systems and information technology fall under both types of sciences with the IT (information technology) part being very close to software engineering and computer science and the IS (information systems) section finding itself associated, by and large, with management and organization sciences. In this book we propose to contribute towards a better understanding of the concept of organization and of organizational behaviour in general, within the information systems discipline.

## SOME DEFINITIONS

For purposes of establishing an initial platform of dialogue between us and the readers, we will use a set of definitions of the discipline of information systems which has been put forward for discussion by the UK Academy for Information Systems (UKAIS, 1997:5). These definitions were formulated by the Board of the Academy, with the help of the Committee of IS Professors and Heads of Department.

### *Definition*

Information systems are the means by which organizations and people, utilizing information technologies, gather, process, store, use and disseminate information.

### *Domain of study*

The study of information systems and their development is a multidisciplinary subject and addresses the range of strategic, managerial and operational activities involved in gathering, processing, storing, distributing and use of information, and its associated technologies, in society and organisations.

If we accept the premise that information systems is a multidiscipline we must be very clear about the concepts of multidisciplinary or interdisciplinary. If we look around we will find examples of other emerging multidisciplines, and maybe these will help us understand the nature of the IS discipline. Let us take International Relations, which is formed by a variety of established disciplines, including Political Science, Law, Economics, Sociology and perhaps a few others.

Is there such a thing as *the* International Relations professional? Perhaps not, or not yet. People who take courses in International Relations can go into a variety of careers such as the diplomatic service, national politics, journalism, public relations or marketing. The choice of career will depend, among other things, on the previous academic and/or professional experience of the candidate. Before the International Relations qualifications existed, these careers were filled by graduates from the more established disciplines. However, a new socio-economic global environment has created a need for a more interdisciplinary approach. So, what the new qualification will do is to enable old problems to be seen in a new light. Hence, International Relations is not yet a discipline but it is recognized as something increasingly relevant in today's world to help deal with today's international issues.

Like International Relations, IS is also an emerging discipline, whose need is clearly felt by practitioners and academics, but which still does not have a 'distinct entity' in terms of other academic disciplines. It is in the nature of any emerging discipline not to have a distinct identity. The issues related to,

and the consequences of, the integration of IT in organizations and society are only now beginning to be felt. So it is very early days for a fully-fledged identity of the IS discipline to emerge. It is complicated to start talking of 'IS professionals' as opposed to 'IT professionals' as it gives an indication that the former will eventually replace the latter. Will that be the case? We doubt it. Coming back to the example of International Relations, it would be the same as saying that the new International Relations graduates will eventually replace Political Science graduates in international affairs.

IS brings a new dimension to various older and more established disciplines, such as Computer Science, Management, Organization Science, Psychology and Sociology, among others. It will probably not replace any of them but it will definitely give science a contribution that no other discipline or interdiscipline can give. The type of contribution that IS can give with its interdisciplinary approach, for example, to Computer Science, is in finding new ways of making the technology more accessible to people and organizations. Such an objective for IS might be derived from and validated by the following statement by Michael Dertouzos, Head of MIT's Laboratory for Computer Science: 'Some people maintain that increased complexity is an inevitable consequence of the times and that the role of computers is to manage complexity. Nonsense (...) the purpose of technology is to make new artefacts fulfil the needs of humans, not to make their lives more complicated' (1997, p. 297).

Having said this, we believe that although IS is not likely to replace any of the more established disciplines, it must work hard and efficiently towards establishing its own intellectual domain. All of the above disciplines, which together make up the interdiscipline of IS, have also been concerned, for a long time, with the same interface areas that today IS claims to represent (e.g. the human-computer, the organization-computer or the society-computer interfaces). One needs only to look at the better known academic journals from those disciplines and search for research articles on topics that we would easily identify as IS topics. Hence, independently, various academic disciplines are tackling research issues which are typically IS issues. Some do it better than others but what IS as an autonomous discipline is striving for is to show that it can do it better and more competently.

The UKAIS definition above claims that 'Information systems are the means by which organizations and people, utilizing information technologies, gather, process, store, use and disseminate information', but does not explain what it means by *means*. Hence we have to go further and get into the actual constitution of the entity called *information system*. Let us take three complementary definitions.

According to Land (1985:215, our emphasis) an information system is:

a social system which has *embedded* in it information technology (...) it is not possible to design a robust, effective information system incorporating significant amounts of the technology without treating it as a social system.

From the point of view of Symons (1991:186/187, emphases added) an information system is:

a complex social object which results from the *embedding* of computer systems into an organization (...) where it is *not* possible to separate the technical from the social factors given the variety of human judgements and actions, influenced by cultural values, political interests and participants' particular definitions of their situations intervening in the implementation of such a system.

And finally, Checkland and Holwell's (1998:110) view is that:

any and every *information system* can always be thought about as entailing a pair of systems, one a system which is served (the people taking the action), the other a system which does the serving [i.e. the processing of selected data (capta) relevant to people undertaking purposeful action].

From these definitions, two key points stand out:

1. talking about an information system implies talking about two different types of entities: one of a social nature (i.e. the system which is served) and the other of a technological nature (i.e. system which does the serving).
2. the process of integration (i.e. embedding) between the two entities is a fundamental issue in the problematic of the information systems discipline.

The definitions above are also useful in bringing out the problem of the distinction (or the non-distinction) between IS and IT. IS/IT (information system/information technology) is the new social object which results from the integration of technological artefacts which are brought in from the external environment with the data, the information, the procedures and the processes generated within the organization. However, as Symons points out, the separation between the two is difficult and sometimes impossible, and when talking about information systems or about *an* information system sometimes one is focusing on the social object and other times on the technological artefacts. The distinction is far from being clear-cut and for that reason the dual acronym *IS/IT* is often used in the literature. The same happens throughout this book.

## THE SPREAD OF INFORMATION TECHNOLOGIES AND THE RISE OF KNOWLEDGE AS THE KEY FACTOR OF WEALTH CREATION

Ever since the 1960s increasing volumes of data have been reduced to text and stored in computer memories. Data which before existed only in paper form or which was not even worth recording on paper given the static nature of this medium in terms of data manipulation, now can be retrieved, combined, re-combined, condensed or transmitted with the greatest of ease. It is this IS/IT-supported capability which now has achieved maturity and critical mass in organizations, thus bringing the issue of information technologies in organizations to a new level of debate. Some say that now it is no longer a question of managing data or even managing information, but it is a question of managing knowledge.

While agreeing that IS/IT do support or enable the development of organizational knowledge it is important not to fall into the temptation of treating data and information as being the same as knowledge. This happened, to a certain extent, in the 1980s and 1990s with the 'knowledge base' euphoria. In line with the advances in artificial intelligence, a 'knowledge base' (as opposed to a 'data base') was proposed as a technological artefact where significant parts of human knowledge would be stored and eventually replaced by dynamic electronic memories supported by powerful storage and retrieval software engines. Although this line of research continues with enthusiasm in some sectors of software engineering, its contribution towards the topic of knowledge in organizations has been marginal. However, the knowledge-base fad has been replaced by other fads such as data-warehousing, customer relationship management (CRM), workflow or document management, often marketed by vendors under the banner of 'knowledge management systems'.

Much of the confusion in the field stems from the meaning attributed to the three foundational concepts – data, information and knowledge. Data are usually taken as being semantic representations of reality by means of symbols (words, numbers, etc). Information, on the other hand, is often thought of as being the result of a combination of data, thus giving it meaning. Finally, knowledge, is often understood to be a kind of major store of information, which can be recorded indiscriminately in people's minds or on computer disks. According to this viewpoint, data, information and knowledge are different manifestations of the same objective phenomena, only organized into different levels of complexity. And this is the source of the confusion.

From the three concepts, the only one that can be considered as reasonably 'objective' is data. Information cannot be an objective concept; for there to be

meaning there must be some form of human cognitive intervention and if there is human intervention, information must be subjective. The processes of interpretation of data and attribution of meaning that we call information must be carried out against some form of personal and pre-existing cognitive backdrop. This backdrop or personal context is what we understand as being knowledge. Individual knowledge is something subjective, partly explicit and mostly tacit, hence not amenable to being recorded, stored or retrieved electronically no matter what technological means are used.

This clarification of concepts is important because the spread of IS/IT in organizations impinges on another area of academic endeavour where individual and organizational knowledge also play key roles. The organization's collective stock of knowledge is rated by most business strategists as being the key differentiating factor between firms in terms of their competitive potential in the so called *new economy*. The new economy is a new model of production and work relations founded upon the social, political and technological macro-trends which characterize the third industrial revolution, also known as the information age, the knowledge society or the globalization era. In the *new economy* only a small percentage of the value of companies (as small as 15 per cent) can be traced to tangible assets on a balance sheet. The rest is derived from such intangibles as work-force skills, culture, speed, flexibility, technologies, brands and so forth. IS/IT are crucial for measuring and managing these assets.

In the world of business strategy, there is a general recognition that the positioning of companies in the competitive market is not enough to maintain sustainable advantage. The knowledge economy environment for both manufacturing and service organizations requires new capabilities for competitive success. The ability of a company to mobilize and exploit its invisible or intangible assets has become far more decisive than investing and managing physical, tangible assets. Intangible assets enable organizations to develop customer relationships, retain the loyalty of existing customers, serve new segments more effectively and efficiently, introduce innovative products and services, produce customized products with high quality, low cost and short lead times, mobilize employee skills and motivation for continuous improvements in process capabilities.

Thus, the knowledge economy is creating organizations built on a set of operating assumptions which are quite different from those of the past. Some of these assumptions are as follows (Kaplan and Norton, 1996):

- Cross-Functions – Integrated business processes that cut across traditional business functions.
- Links to Customers and Suppliers – IT enables the integration of supply, production and delivery processes.

- Customer Segmentation – Customized products and services with high quality, low cost and short lead times.
- Innovation – Product life cycles continue to shrink.
- Knowledge Workers – The divide between the intellectual elite (managers and engineers) and the manual labour force is disappearing.
- Global Scale – digital networks allow multinational companies to do all of the above on a global scale.

In the industrial economy of the past when capitalists spoke of wealth, they spoke of the property of natural resources, factory plants or industrial machinery. In the knowledge economy of the present when capitalists speak of wealth they are speaking of control over knowledge and knowledge resources. As an example, Bill Gates, one of the richest men in the world, owns mostly knowledge.

## PARADIGM CHANGES

Much of this book centres on changes in various paradigms: IS/IT paradigms, scientific paradigms, organizational paradigms, strategic thinking paradigms and others. According to Kuhn (1970), the most fundamental set of assumptions adopted by a professional community which allows its members to share similar perceptions and engage in commonly shared practices is called a paradigm. Thus, we might say that the information systems paradigm is reflected in the definitions, the literature and the practices accepted and shared by the various communities who research, teach, work with and comment on information systems. Within a paradigm, it may be possible to find tendencies which are central and dominate, and tendencies which are marginal and which are trying to establish themselves. This is the case with information systems, where the information technologies (hardware, software and communication technologies) are the dominant part of the paradigm and the organizational-oriented tendencies are still at the margins.

The interest in the area broadly known as information systems started with a strong technological leaning, still the dominant part of the discipline's paradigm and covering areas such as systems analysis, systems specification, database management, software development, systems integration, software implementation or software auditing. In the last 20 years, a minority trend of the paradigm, focused on the organizational and managerial issues which are amongst the consequences of the spread of IS/IT in organizations, has been emerging. Such issues are manifold. They cover changes in work practices, work structures and professional training; impacts on organizational power and institutional politics; consequences at

the strategic level and on organizational forms; strong impacts on organizational infrastructure and so on. However, although this minority trend has been steadily gaining ground, the problems associated with the development and implementation of IS/IT are still very apparent and create a major source of dissatisfaction in organizations.

The dominant discourse in IS/IT has been pitched at the micro-level where each IT application is analysed in isolation, not only in what concerns its development (either in-house or as a customized off-the-shelf package) but also regarding its implementation. It is customary to find implementation programmes (often called *change management* programmes) which deal exclusively with that application, ignoring others as well as organizational units which are not at the centre of the implementation in question but which could, and most certainly would, be affected by it.

This state of affairs has been the cause of many medium and long term failures of IS/IT implementation programmes, from the point of view of the customer. From the point of view of the implementer, usually a short-term view, the implementation programme is successfully completed when all the deliverables have been delivered OTIB (on time in budget). However, in view of the fact that the implementation programme has ignored a host of important organizational variables, as soon as the implementer leaves the problems start. The most frequently quoted examples of this are the ERP (Enterprise Resource Planning) software implementations which have caused and are still causing countless problems to organizations. The reasons behind the problems are never technological (in the sense that the software does what it is supposed to do), but always organizational. In spite of the intensive training programmes (sometimes included in the change management effort), many organizations still have great difficulty in actually changing the old manual processes in order to take the full benefits of the investments made in the software application.

In fairness to implementers of IT applications it must be said that often the implementation programmes are trimmed out to the barest of essentials in response to demands from the customer for keeping costs as low as possible. And this is precisely one of the key issues which this book is intended to tackle. But who is responsible for the commissioning of IS/IT implementation projects and, therefore, ultimately responsible for cutting down on (organizational) implementation costs? Top and senior managers are responsible.

Although they do not often appear as ultimately responsible for the poor performance of new investments in IS/IT given the various protection layers of hierarchical decision making and of institutional politics (including blaming the implementer), top and senior managers are responsible. In part, they are pressured by a need to show positive business results which, at least in the



short term, can be achieved by shrinking implementation costs. But, as all experienced managers know, in the medium to long term we end up paying for (or benefiting from) the decisions taken in the short term. And in addition to this managerial myopia, many top and senior managers suffer from an acute lack of awareness regarding the power and depth of organizational issues.

When you open up a book on information systems implementation/management the issue of organization is only touched upon, usually to describe organizational forms, structures and processes. Likewise, when looking at a book on organization, information systems rarely appear as a topic and when they do, the debate is centered on the impact of IT on a variety of macro-organizational issues. Following the trend of deep fragmentation between the sciences in general, the topics of organization and information systems are treated as independent and almost divorced from each other. As a result, IS/IT development, IS/IT implementation and IS/IT management issues are presented as quite separate from strategic analysis, organizational development or change management topics. This places severe limitations not only on the development of the discipline but also on the solution to the practical problems that information systems specialists find when confronted with real-world organizations.

On the other hand, over the years, organization scientists and practising managers have become increasingly aware that the tools, techniques and advice found in textbooks and manuals intended to guide the activities of organizing and managing have always been somewhat *off target*. This becomes evident when, as a teacher of management and organization, one of the most frequent comments to be heard, especially from students with some work experience, is 'ok, it sounds fine in theory but it's hard to see how it all applies in practice'.

Such has been the situation until recently, when a new compromise between theory and practice – a major paradigm change – seems to be finally on the horizon. The compromise, which is receiving increasing amounts of attention from the organization science and management communities, rests upon the so called 'new science'.

New science is making us more aware that our yearning for freedom and simplicity is one we share with all life. In many examples, scientists now describe how order and form are created not by complex controls but by the presence of a few guiding formulas or principles repeating back on themselves through the exercise of individual freedom. The survival and growth of systems that range in size from large ecosystems down to the smallest microbial colonies are sustained by a few key principles that express the system's overall identity combined with high levels of autonomy for individuals within that system (Wheatley, 1999: 13).

Based on notions such as complexity (as opposed to reductionism), self-organization and self-steering (as opposed to determinism), chaos and unpredictability (as opposed to command and control) or sensemaking and understanding (as opposed to rationalizing and predicting), the 'new science' offers new ways for bridging the gap between theory and practice. Bundled under the banner of the Complexity paradigm (Waldrop, 1992), the new tenets make total sense as far as the activities of organization and management are concerned and contain the seeds for the legitimation of a *new order* that many organization scientists and practising managers had long been waiting for.

Constructs such as organization, organizational knowledge, organizational climates or contexts are all informed by one or more epistemologies. Epistemologies, in turn, influence the methodologies which are used in researching and theorizing about such constructs. A methodology influenced by a positivist epistemology will treat organizations as objective entities with given features which can be freely researched by an independent observer. A methodology informed by an interpretivist epistemology will recognize that organizations cannot be researched as wholly objective phenomena and that, in fact, organizations are the result of joint action of their members in their effort to make sense of the reality among and around them. For example, Ghoshal and Moran (1996) defend the position that organizations are much more than economic instruments that mirror the market or respond to market forces. Instead, they argue that 'organizations' real contribution to economic progress is in their unique ability to create their own distinct contexts' (p. 63), and that such contexts are what enables companies to 'actually defy the relentless gale of market forces' (ibid.).

In viewing organizations as a result of the action of the people within them, with their vast reserves of knowledge and aspirations, Ghoshal and Moran are supporting an interpretivist stance in managerial thought. Such a stance, also part of a paradigm change, is placed in a middle ground between two opposing schools of strategic management: the strategic planning orthodoxy and the emergence or incrementalist heterodoxy. Joyce and Woods (1998) call this intellectual posture the *new modernist* school of strategy, an approach which blends the unreserved optimism and wishful thinking of rational planning (modernist thinking) with the systematic scepticism of the postmodern management thinkers about most forms of planned change.

This new managerial epistemology is characterized by the abandoning of strict reductionist and positivist methods and the adoption of a more tolerant perspective towards ambiguity and everlasting change. It is a fundamentally action-oriented perspective which goes back to basics regarding the business of management, thus returning the figure of the manager together with leadership and managerial action to centre-stage of the theorizing about strategy

and organization. In a way, it is a return to the pioneering ideas of thinkers such as Mary Parker Follet (1924), Chester Barnard (1938), Peter Drucker (1955), Philip Selznick (1957), Burns and Stalker (1961) or Charles Handy (1978), reinforced by contemporary academic management authors such as Argyris and Schon (1978; 1996), Ghoshal and Bartlett (1993; 1994), von Krogh and Roos (1995), Nonaka and Takeuchi (1995) or Von Krogh, Nonaka and Ichijo (2000).

Thus, one of the key arguments in this book is that the current technology-oriented paradigm, upon which the information systems discipline has been founded, is changing. The new paradigm, supported by the new scientific order announced by the Complexity archi-paradigm, will help the discipline to build an holistic, all-encompassing and action-oriented framework for the achievement of its final aim: the integration of information technologies and the social structures of organization. Complexity and new approaches to organization theory also support a revival of managerial action as the key focus of attention for the strategic development of organizations. In this book we aim at applying such managerial thinking to IS/IT strategic development, including issues such as IS/IT alignment, IS/IT corporate governance and IS/IT-related consulting, education and training.

## SUMMING UP THE PURPOSES OF THE BOOK

This book is the result of a series of intellectual challenges related to academic, managerial and consulting activities in the areas of business information, information technology, strategy, organizational development and change management, which have presented themselves to the author over the years. Such challenges, which make up the purposes of this book, may be expressed as follows:

1. Arguing that there is a need to show that the knowledge imperative in business and organizational development can only be attained if organization and information systems are treated as one integrated topic and not as two separate ones.
2. Understanding and explaining that the approach to organizational (knowledge) development depends upon one's intellectual stance on human knowledge and cognition and these, in turn, depend on the stance in relation to scientific methodology.
3. Attempting to introduce Complexity as a new scientific epistemology and Complexity-influenced approaches to cognition and social systems which point to behaviour and action as the bases for intervention in both organization and information systems.

4. Aiming to relate the economic imperative of knowledge creation to action-based managerial models dealing with context formation, organizational change and IS/IT strategic alignment/development.
5. Exploring the concept of IS/IT-related organizational contexts and identifying the dimensions of such contexts as the shapers of IS/IT strategic alignment.
6. Suggesting the notion of *IS/IT strategic development* (incorporating IS/IT alignment) as a contribution towards the opening-up of new avenues in the management of IS/IT and of new forms of intervention regarding the organizational integration of information systems.
7. Doing all of the above trying never to lose sight of the needs of practitioners, meaning not only IS/IT managers, top and first-line managers but also other stakeholders involved in IS/IT corporate governance.

Although the book is not intended as ‘light’ reading for managers, it does take, as a starting point, the needs of managers, both in terms of understanding and of acting upon the phenomena of organization and information systems. Thus, an important objective in this book is to contribute towards new ways of perceiving, understanding and handling IS/IT-related organizational phenomena, as close as possible to the world of practice.

In terms of audience, the intention of this book is also to provide the people who are in a position to bring about change (i.e. academics with a pragmatic bent, applied researchers, postgraduate students and high-impact managers) with an epistemological/theoretical background which will help them to break away from the status quo. The status quo is the climate of positivist, rationalist and reductionist thinking imported from the hard sciences which has led academics and practitioners to believe that quantitative management tools, engineering-inspired organizing methods and mechanistic change programmes were the ‘right way’ to manage, to organize and to make information systems more effective.

## THE RESEARCH METHOD

Our research method emphasizes multidisciplinary theory-building, based on what Itami and Numagami (1992) call ‘logical compound synthesis’. This method is presented as an alternative to the three more conventional research methodologies – mathematical model analysis, statistical data analysis and in-depth case analysis – and derives its plausibility from ‘the robust coherence among its components and from the logical connections among its conceptual constructs’ (ibid, p. 133). Logical compound synthesis gets its inspiration from the chemical sciences, where researchers synthesize various

materials into a compound which is new to the world. In this book we have also selected various theoretical concepts and empirical findings as material and have synthesized them into a plausible logical story. The theoretical concepts and empirical findings come from the research literature on management, organization science and information systems, and the synthesis is a new organizational approach to information systems development, implementation and management.

In an applied field of knowledge such as information systems, the research methodology must always strike a balance between the inductive and the deductive methods of theory building. Being firmly anchored in the management sciences, the information systems discipline must be mindful of the views put forward by well-known management researchers, such as Alfred Chandler. That author argues that theory development in management should be carried out 'from the point of view of the busy men responsible for the destiny of the enterprise, rather than being [just] deduced from the disciplinary premises of social scientists' (quoted in Ghoshal and Bartlett, 1993:25). The resulting method, also applicable to this book, may be described as something close to speculative reasoning, in the way that has been suggested by Lundberg (1984):

speculative reasoning which is carefully done and which probes the pragmatic dimension of a major, increasingly crucial phenomenon, has utility for it begins to inform and guide practice and to stimulate enquiry (quoted in Stickland, 1998: 28).

In the main, the book rests upon conceptual and empirical research carried out as part of a PhD programme at the London School of Economics (Magalhães, 1999) and as such is firmly anchored in the existing published literature in the various fields investigated. To this academic research some new ideas have been added, especially from the new literature on Complexity. Being a body of knowledge which is barely emerging, some of these ideas may still have to be validated in terms of the traditional processes of scientific accreditation.

## ROAD MAP OF THE BOOK

A brief history of the new organizational approach is presented in Chapter Two, as an introduction to the increasing complexity of the integration between IS/IT and the organization. In this context, IT can be regarded as the new organizational technology. In Chapter Three, Complexity is introduced as the starting point for many changes to come in the fields of economics, management and organization theory. This chapter opens up the way for

Chapters Four and Five, where the new approaches to organization, management and strategy are discussed, with an emphasis on knowledge and action-oriented approaches. Chapter Six is about the evolution of the various perspectives on IS/IT development and implementation, ending with the perspective developed in this book: organizational holism. Chapter Seven contains a conceptual discussion about a new perspective on *IS/IT* strategic alignment, based on the managerial action–organizational context duality. Chapter Eight comprises a practical reflection on IS/IT strategic development and Chapter Nine wraps up the book with some conclusions.

For a graphic representation of the book's road map, please see Figure 1.1.

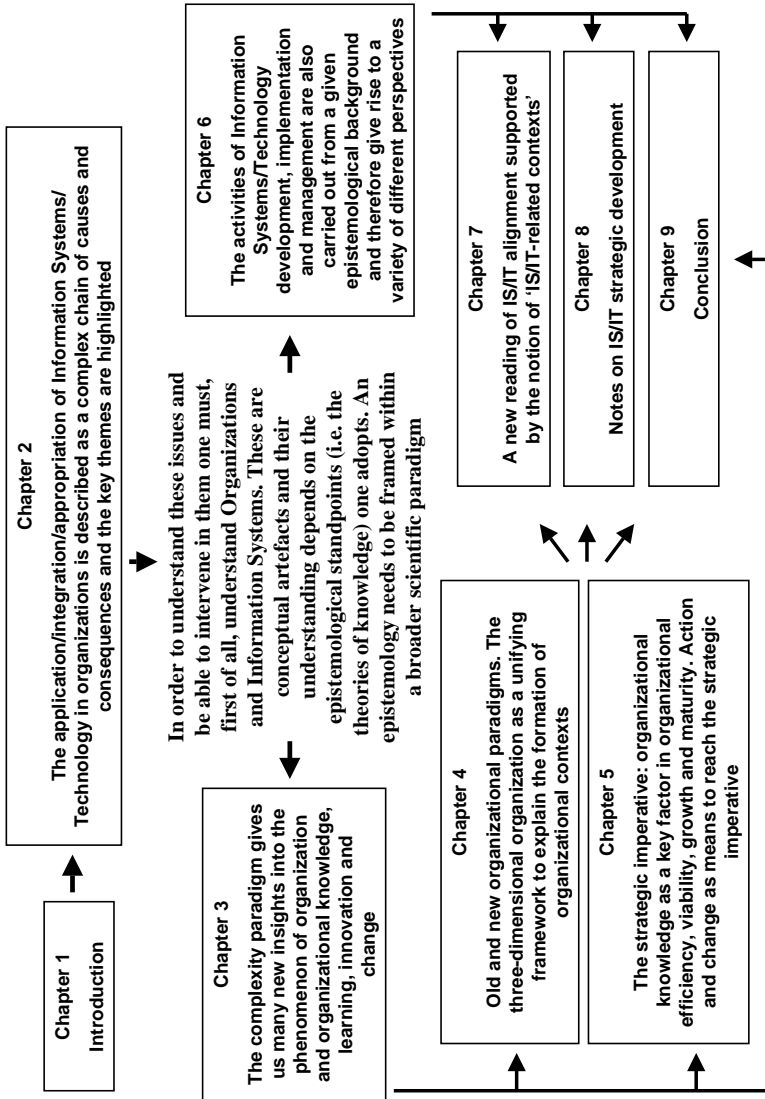


Figure 1.1 Road map of the book