INFORMATION SYSTEMS AND ORGANISATIONAL CHANGE: THE CASE OF FLEXIBLE SPECIALISATION IN CYPRUS

Neophytos Elia CHRYSOCHOS

Department of Information Systems
London School of Economics and Political Science

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ProQuest LLC
789 East Eisenhower Parkway
P.O. Box 1346
Ann Arbor, MI 48106-1346

Dedicated to my children

Elias, Ermos, and Pani.

Abstract

This research examines the relationship between organisational change and information systems development in the case of an effort to implement flexible specialisation in Cyprus. In the centre of this research are the inter-organisational relationships developed in the flexible specialisation initiative and the role IT played in the formation of such relationships. Successively, the kind of organisational changes that take place as well as the driving force(s) of such changes are examined.

In order to study and analyse such a complicated socio-economic phenomenon an interpretive epistemology was adopted. Analysis of the empirical work draws mainly from theories concerning information systems while insights are drawn from disciplines that have studied organisational change and the concept of flexible specialisation in particular, such as industrial economics, geography and organisational theory.

The research method followed is a multiple case study analysis. One case study was conducted in Emilia-Romagna and provides a point for reference for the cases of flexible specialisation in Cyprus, which is the main focus of the research. The case study in Cyprus was conducted over a period of three years, while the case study in Emilia-Romagna was done at one particular point in time.

The key contribution of this research is the suggestion that the use of information and communication technologies depends on the complexity of the inter-organisational activities, rather than causing them, as the information systems literature tends to suggest. Furthermore, the case study demonstrates the significance of institutional and cultural factors for the non-emergence of inter-organisational complexity, and subsequent limited role attributed to IT in the flexible specialisation experiment.

Acknowledgements

The working title of this thesis has been 'Synthesis or Confusion'. I remain deeply grateful to all who have provided support in times of confusion and inspiration in my pursuit of knowledge. Synthesis, however, remains elusive.

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I would like to acknowledge all the interviewees in the case studies who spent their time and shared their views and experience with me. In particular, I would like to thank Miss Valeria Bandini for organising all the interviews and introducing me to the organisations studied in the region of Emilia-Romagna.

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Table of Contents

PART II - FOUNDATION OF THE RESEARCH

PART III - EMPIRICAL WORK

APPENDICES

Table of Tables

Table of Figures

CHAPTER 1

Introduction

1.1. NATURE OF THE RESEARCH PROBLEM

New forms of economic organisation, such as networked, knowledge-based, federated firms, are explored today in organisation theory, business policy, industrial economics, and information systems. Although different in perspective, all of these efforts to study the current phenomenon of organisational change share the same basic view: that IT/IS has helped the realisation of such kinds of organisation.

It is widely believed that the convergence of computer, communication and control technologies have made it feasible for corporations to install world-wide information systems (ISs) enabling them to compete in local as well as global economies. Yet, at the same time, new information technologies (ITs) can also open up new windows of opportunities for small and medium enterprises (SMEs) which would allow them to improve their competitive position and to expand their market share.

Such opportunities for SMEs have been explored in certain areas of economics and geography, such as in Neo-Schumpeterian theories and the debate on "flexible specialisation". The latter is frequently referred to and quoted as a new promising economic model not only in academia but particularly in real policy making situations.

In the information systems literature, the relationship between information systems innovation and designing organisational configuration has always been a major research theme, though it still remains ambivalent. From the early days of computers, researchers started observing the impact of computers on organisations and argued that significant benefits would result from transforming organisational structure rather than from mere automation. In the 1980's, computers were associated with more 'strategic' organisational issues and a whole stream of research and literature has been devoted to the efforts required to release the information technology potential to support strategic changes, such as entering new businesses, forming new links with suppliers and customers, and re-positioning in relation to competitors.

More recently, the question of information technology and organisational changes became central to information systems research, with arguments that information technology contributes to the emergence of new organisational forms which are more appropriate to survival and excellence in the global economy. Yet, this connection between information technology and designing organisational configurations has never maintained cause and effect relationships: information technology implementation contributes to (desirable and undesirable) organisational changes (Hammer 1990), but also depends on the organisational state and capacity to manage change of a business enterprise or institution (Pettigrew 1998; Strassmann 1985).

In short, the relationship between IT and organisational change remains vague, better expressed by the commonly used expression: IT is an 'enabler' of change. It is still poorly understood how and under what conditions IT implementation does lead to

organisational changes which allow business firms to compete in the local or the global economy.

1.2. AIM OF RESEARCH

In this research, the relationship between IT and designing organisational configuration in the case of an effort to implement a version of the economic model of flexible specialisation (FS) in Cyprus is studied. This 'experiment' attached significance to both organisational structure and IT. In fact, it aimed at the implementation of organisational forms, which have acquired significance in the information systems literature, because it is assumed that they are enabled by information and communication technologies. The flexible specialisation initiative in Cyprus was explicitly intended to use technology to achieve desirable organisational developments.

The Cyprus FS experiment provided us with the opportunity to study the relationship between IT and organisational issues in terms of:

a. the extent to which and the way IT contributed to the formation of the targeted organisational type, i.e. the network of SMEs and service agencies (in other words the relationship between IT implementation and organisational change);

b. the way this particular theory-driven organisational change allowed for the utilisation of IT in order to achieve desirable socio-economic goals, i.e. we examine:
   i. the guidance for IT use that stems from the FS theory;
   ii. the process of organisational change that took place since the Cyprus government began implementation of its adopted FS policy in order to trace how this process accommodated the development of information systems and information infrastructure.

In other words, in the process of organisational change of FS implementation we examine the double link of:

a. how targeted and actual organisational development affected plans and process of the development of IS, and

b. how information technology was (or was not) used to facilitate the development of new organisational entities.

1.3. SIGNIFICANCE OF RESEARCH

It is generally assumed that IT enables organisational change (Turner 1998; Hammer and Champy 1993; Scott-Morton 1992). However, we have inadequate understanding of the conditions under which such 'enabling' potential is released.

Consequently, the first significant point of this thesis lies on the need for more research that contribute to increase our understanding of the question of organisational change and IS development. Empirical research in the field of information systems continues to reflect a rather narrow paradigm which assumes away much of the richness and complexity of the interaction between organisational change and IS development. There is a need for more contextualist case studies that contribute to the search for increase understanding of the variety of organisational trajectories in order to strengthen information systems' theoretical base. This thesis offers a contribution in that direction by undertaking to study the interaction between organisational change and IS development using a contextualist mode of inquire.

The second point of significance lies within the context that this research is undertaken, the context of flexible specialisation. Policy-makers who are responsible for promoting FS strategy have little methodological guidance to deal with the interaction between technology and organisational objectives. Without understanding

the functioning, dynamics and causes of inefficiencies in different cultures, the success of any effort to promote such socio-economic strategies is questionable.

By making explicit the interaction between technological, organisational and cultural context, a third significance of this research is to suggest tentative guidelines for policy makers. How to break a vicious circle of organisational under-development and poor IS infrastructure and start up a virtuous circle of organisational development enabled by IS development.

1.4. STRUCTURE OUTLINE

The thesis is divided into four parts. In this first part, chapter 2 presents key theoretical foundations that will assist in understanding the enabling role of IT in new emergent forms of organisation and explores the interrelation of information systems development and organisational structure. Finally, different perspectives on organisational change are given. Chapter 3 introduces the concept of flexible specialisation. Subsequently, three cases of flexible specialisation are reviewed and structural characteristics are highlighted. The chapter concludes with issues of organisational change and IT/IS in the context of flexible specialisation.

In the second part, chapter 4 starts by defining the research questions. It then argues for a contextual approach and justifies the research approach, method and design based on the objectives of the research. Chapter 5 introduces the case of the flexible specialisation "experiment" in Cyprus. Cyprus has a number of features which makes it an appropriate context for the flexible specialisation strategy. In the final section of this chapter economic and business developments since the launching of the flexible specialisation in Cyprus are given.

Consequently, the next part is entirely devoted to the empirical research carried out and it is presented into two chapters. Chapter 6 presents the case of Cyprus, while

chapter 7 presents the case of Emilia-Romagna. In both cases, particular attention is paid to the effects of IT on organisational changes and the relation of information systems and business growth.

In the final part, chapter 8 analyses the case studies and discusses the major contributions of the thesis in conceptual and operational terms. The experience and further understanding achieved by the empirical research are summarised along the lines of organisational aspects, information systems aspects, and cultural and institutional factors. Finally, chapter 9 outlines the contributions of the thesis in both theoretical and practical terms. It further addresses issues for the utilisation of the research contributions in terms of potential future research topics.

PART I

LITERATURE REVIEW

CHAPTER 2

Organisational Change and IT/IS

This chapter reviews the literature only to those aspects that are relevant to the small firms and firms forming partnerships. It presents key theoretical foundations that will assist in understanding the potential enabling role of IT in new emergent forms of organisation and the interrelation of information systems and organisational change. The chapter concludes with different perspectives on organisational change.

2.1. FROM THE ENTREPRENEURIAL TO HYBRID FORMS OF ORGANISATION

The entrepreneurial organisational form was identified by the beginning of the twentieth century alongside the other traditional organisational forms, namely: the Bureaucratic Hierarchy; the Matrix Organisation; and the Adhocracy by Taylor (1911), Weber (1947), and Fayol (1949). More recently a variety of new organisational forms have been suggested as the future dominant organisation that will replace the traditional ones. This has been the result partly of the rapid technological changes taken place since the turn of this century, bearing in mind that IT/IS has helped the realisation of such changes (Baskerville et al. 1994; Burn 1994; Huber 1991).

2.1.1. THE ENTREPRENEURIAL FORM

Economists resorted to the French language for a word to designate the person or group of persons who assume responsibility for combining the factors of production into a business organisation and keeping this organisation in operation (Applegate 1994).

According to the Collins dictionary, "entrepreneur" is the owner or manager of a business enterprise who, by risk and initiative, attempts to make profits. Schumpeter (1950) and Drucker (1974) stress the creative/innovative nature of entrepreneurs. Drucker (1974) quotes: "The entrepreneur has to redirect resources from areas of low or diminishing results to areas of high or increasing results ... has to slough off yesterday and to render obsolete what already exists and is already know ... has to create tomorrow".

Mintzberg (1991) observes that the entrepreneurial form tends to be found in small owner-managed companies, especially in their formative years or turnaround situations both of which require the imposition of strong vision, where the chief executive/owner takes personal control and directs supervision of much of what goes on. The environment in this case is at the same time simple, in the sense that is comprehended by a single and dynamic individual, with an unpredictable future.

The structure and technology (defined in the widest sense) of this form is simple, with few support staff, a loose division of labour, minimal differentiation among its units, and a small managerial hierarchy. Little of its behaviour is formalised, and it makes minimal use of planning, training, and the liaison devices. It avoids using the formal devices of structure and it minimises its dependence on specialist staffs who are hired on contract when needed.

Autocracy and charisma seem to figure prominently in the entrepreneurial form. The entrepreneurs, who are usually charismatic leaders, often set-up their own business simply because they cannot tolerate the control imposed upon them by bureaucracies in which they might have worked. Organisational goals and strategy are all revolved around the entrepreneurs.

With the power in hand and centralised decision-making on all important issues, the chief executive/owner has a wide span of control and it is not uncommon for everyone else to report to him. Information flows informally in this kind of structure, likewise, workflows do and this allows high flexibility where the chief executive/owner is able to take quick decisions. Flexibility is the great strength of the entrepreneurial form.

However, the process of decision-making tends to be highly intuitive and non-analytical, often thriving on uncertainty and orientated to the aggressive search for opportunities (Mintzberg 1983). Generally, strategy reflects the chief executive's implicit vision, personal beliefs, and judgement, and is an extension of his own personality and leadership.

A large number of entrepreneurial ventures fail despite the spirit of collaboration and trust that is often found in these organisations. Applegate (1994) suggests a number of reasons which, among others are:

i. lack of access to capital and specialisation tends to limit opportunities to pursue new business, develop new products, and enter new markets;

ii. lack of power tends to limit their negotiating position with more powerful competitors, suppliers, or buyers; and

iii. concentration of power and authority in one or few individuals limits the ability of the company to deal with the complexity associated with its growth.

When a firm reaches a certain size and complexity of operations the entrepreneur has to decide whether to introduce a different form of management or sell the firm and launch a new venture. Many choose the latter option. Nevertheless, Mintzberg suggests that when organisations reach this point they either evolve towards bureaucratic hierarchies and Tayloristic management or "some are so small that they can rely on mutual adjustments for co-ordination, and they constitute a hybrid with the open lateral communication channels ..." (Mintzberg 1983).

2.1.2. HYBRID ORGANISATIONAL FORMS

Among others, terms such as "networked organisations" (Cooke and Morgan 1990; Morgan 1992; Lorenz 1991; Rhodes 1991; Powell 1991), "strategic networks" (Jarillo 1993; 1988), "value-added partnership" (Johnston and Lawrence 1988), "inter-organisational systems" (Cash and Konsynski 1985), "information partnership" (Konsynski and McFarlan 1990; Mody 1990), "federal" (Handy 1989), "flex-firm" (Toffler 1990) have appeared in the literature. Though each one takes a slightly different view, they all rely on the advantages offered by IT and relate organisational change with the development of ISs. In short, they all rely on the information-based organisation, to use the term of Drucker (1988).

A full review of all those suggested as new emergent forms of organisation is beyond the scope of this attempt. Our review will be limited to those forms identified as relevant in the context of this research, these are: the flex-firm; the federal; and the network form.

2.1.2.1. THE FLEX-FIRM FORM

The flex-firm is a novel organisational form suggested by Toffler (1990) and is allegedly relevant to family-based run SME's. This form emerged as a result of Toffler's observations based on small family-based enterprises run in several regions of the "Third-Italy".

The flex-firm form involves extensive use of information technologies at the production level, while above this level everything is informal without any notable use of IT. The information system of the flex-firm, which reflects the management of the organisation, operates in a very different way from other types of organisation, which are non-family based.

The family-based nature brings in the firm an information system that is profoundly anti-bureaucratic, a specific ethic and ideology. Ideology, to use Mintzberg's (1991) view, includes organisational culture, norms, beliefs, and values that knit a disparate set of people into a harmonious and co-operative entity. In such a family environment

knowledge and information are shared and this implies less cubby-hole and channels in the organisation.

Family members have a deep sense of ownership of the firm; they have high motivation, are strongly loyal, and often work very intensively. Also, in a family environment subjectivity, intuition, and passion tend to govern, whereas in non-family based organisations decisions are supposed to be impersonal and formalised (Toffler 1990).

In short, this form suggests that wherever a family relationship plays a part in business, bureaucratic values and rules, and power structures do not find place to establish. In these situations the patriarch or, occasionally, the matriarch holds power, as Toffler (1990) titled them, and eventually passes on to a handpicked relative.

However, the flex-firm concept does not imply lack of structure; instead, it does suggest an ad hoc way of using information in an informal system. This type of environment seems to rely on the high degree of trust existing in family-based organisations. In turn, this gives organisations high flexibility, which allows for fast change and ability to adapt better to new market needs, and minimal information processing costs, which effectively reduces management costs.

2.1.2.2. THE FEDERAL FORM

Federalism involves a variety of individual groups allied together under a common flag with some shared identity. It combines co-operation and autonomy. The former, through size, gives them clout in the market place and financial centres, while the latter, through small production units, gives them the flexibility needed. Long-term strategies, like investments and market penetrations, are formed at the federal management level (Handy 1989).

Federalism differs importantly from decentralisation. In decentralisation certain tasks or duties are allocated to the lower levels with top level retaining control, while in

federalism the centre (the term top level does not apply in federalism) does not control or direct, so much as co-ordinate, advise, influence, and suggest.

To better appreciate the difference between the two, one can consider the implications from an information system viewpoint. Control demands dense information flow bi-directionally. The use of IT aims at alleviating processing problems. In a co-ordinate situation information flow is limited.

Federalism, however, is a word with strong connotations from politics so far, at least. It suggests that no one ceded power from the centre to its component parts. Federal constitutions arose when individual states decided to merge together, as in Australia, or when the central power was destroyed by war or revolution, as in former West Germany.

A clear understanding of the role of the centre is crucial to proper federalism. As far as organisations are concerned, Handy (1989) suggests that as today they seek to contract their cores and cut down their staff, eventually the core has to stop asking for information, and trying to control everything from the centre. That is when decentralisation turns to federalism. Ultimately, small cores make federalism inevitable and large cores make decentralisation too expensive, Handy (1989) argues.

Isamu Yamashita of Mitsui, a Japanese corporation which came close to federalism, quotes "the best corporate structure today comprises a small strategic centre supported by many front-line outfits" (Naisbit 1985). Thus, as a strategic unit, the centre has to concern itself largely with the future, with plans and possibilities, scenarios and options.

Handy (1989) argues that the federal organisation is not only different in its form but also culturally. In particular, federal organisation needs to build trust, which can be earned by giving away power. From this point and onwards the role of the top management changes drastically. The manager is not any more the commander,

inspector, and judge. Rather, it is a role of teacher, counsellor, and friend, in Handy's words.

Handy (1989), at the same time, warns that if the manager fails to evolve the organisation to federalism, then control reverts to the centre, and the centre becomes too big and too expensive. Therefore, much depends on leadership, leadership of ideas not leadership of personality. Ideas can be consulted with the managers of the parts in a way of persuasion and argument leading to consensus.

2.1.2.3. THE NETWORK FORM

Networks are explained and described in the literature in various ways. However, there is general agreement that networks are organised systems of relationships. These relationships constitute the network structure that may in turn take many different forms (Szarka 1990). The relationships developed within a network are relatively stable and enduring exchange patterns and collective actions (Easton 1992), with the pooling of expertise and information becoming characteristics which do not match conventional organisational forms. Ching et al. (1993) describe networks as a unique form of organisation that are not based strictly on price mechanism but on co-ordination through adaptation and mutual dependence.

Other writers (Alter and Hage 1993; Sydow 1992; Powell 1991) see the network as a new organisational form located between the two traditional forms of hierarchy and markets (Powell 1991, p. 268 for a discussion of traditional forms). Powell (1991) argues that "... in networks modes of resources allocation transactions occur neither through discrete exchanges nor by administrative fiat but through networks of individuals engaged in reciprocal, preferential, and mutually supportive actions ...". He goes on to suggest that networks are particularly apt to circumstances in which there is need for efficient and reliable information. On the same mode, Kaneko and Imai (1987) suggest that information passed through networks is 'thicker' than information obtained in the market, and 'freer' than that communicated in a hierarchy.

Powell (1991) takes a broader view, as follows:

> "... networks are especially useful for the exchange of commodities whose value are not easily measured. Such qualitative matters as know-how, technological capability, a particular approach or method of production, a spirit of innovation or experimentation, or a philosophy of zero defects are very hard to place a price tag on and are not easily traded in markets nor communicated through hierarchy. The open-ended, relational features of networks, with their relative absence of explicit quid pro quo behaviour, greatly enhance the ability to transmit and learn new knowledge and skills".

Central to the discussions of network forms of organisation is reciprocity, which is a rather ambiguous concept. In sociologists' and anthropologists' view, reciprocity is couched in the language of indebtedness, while Keohane (1986) notes that the literature in international relations associates reciprocity with equivalence of benefits. Other social scientists agree that reciprocity is enhanced by taking a long-term perspective with security and stability encouraging the search for new ways of accomplishing tasks, promoting learning and the exchanging of information, and engendering trust. Networks, however, are not characterised solely by co-operation, but each point of contact can be a source of conflict as well as harmony (Powell 1991).

Jarillo (1993; 1988) and Miles and Snow (1992) discuss the 'network' from a more strategic perspective and define it as a long-term purposeful arrangement among distinct but related for-profit organisations. They further argue that firms within the network gain competitive advantage by optimising activity costs and minimising co-ordination costs. Central to Jarillo's (1988) concept of the 'strategic network' is the existence of a hub firm, as for example in the case of Benetton Spa (Jarillo 1993), " a firm which co-ordinates and defines the production process. Between the focal firm and its trading partners exist "especial relationships" which have most of the characteristics of a hierarchical relationship".

This element of hierarchy retained in strategic networks differentiates them from "co-operative networks" which are based on co-operative relationships (Jarillo and Ricart

1987). Central, however, to the co-operative networks is trust, which is the mechanism that lowers transaction costs and thus making the network economically viable. In Jarillo's (1993) view the geographical and cultural component found in networks contribute to develop trust through possibly long personal relationships and a reputation of fairness. With regards to fairness he gives the example of orthodox Jews in the diamond industry that can trust each other because there is a strong tradition of honesty, and a clear possibility of "social punishment" if business is not conducted in all fairness.

Sydow (1992) suggests that regional networks of SMEs embedded in an industrial district constitute an alternative to strategic networks. They are similar to strategic networks in that they consist of formally independent but highly interdependent organisations. They exhibit, nevertheless, the characteristics of loosely coupled systems (Orton and Weick 1990) and carry common norms and values to an extent that may prompt us to speak of a 'network culture' or even of a network identity. On the other hand, regional networks are different from strategic networks in that they are not strategically led by hub organisations.

For the purpose of this study, the term "industrial network" (Easton 1992; Hakansson 1990) is also relevant. It differs from social networks and networks in general, by referring to manufacturing activities. In this case, networks are defined as a complex array of relationships between firms that are more or less embedded in the wider web of industrial activities. Industrial networks emerge and develop as a consequence of exchange and specific investments, and over time some activities are modified and adapted to each other. Within industrial networks other networks, like social and strategic at different levels, regional or international, may be embedded.

In the process of networking, there is a general agreement that inter-organisational relationships are developed, which have three basic forms. These are illustrated in figure 2.1. The dyad or pairwise relationship is the simplest form and has probably received the most attention in empirical research.

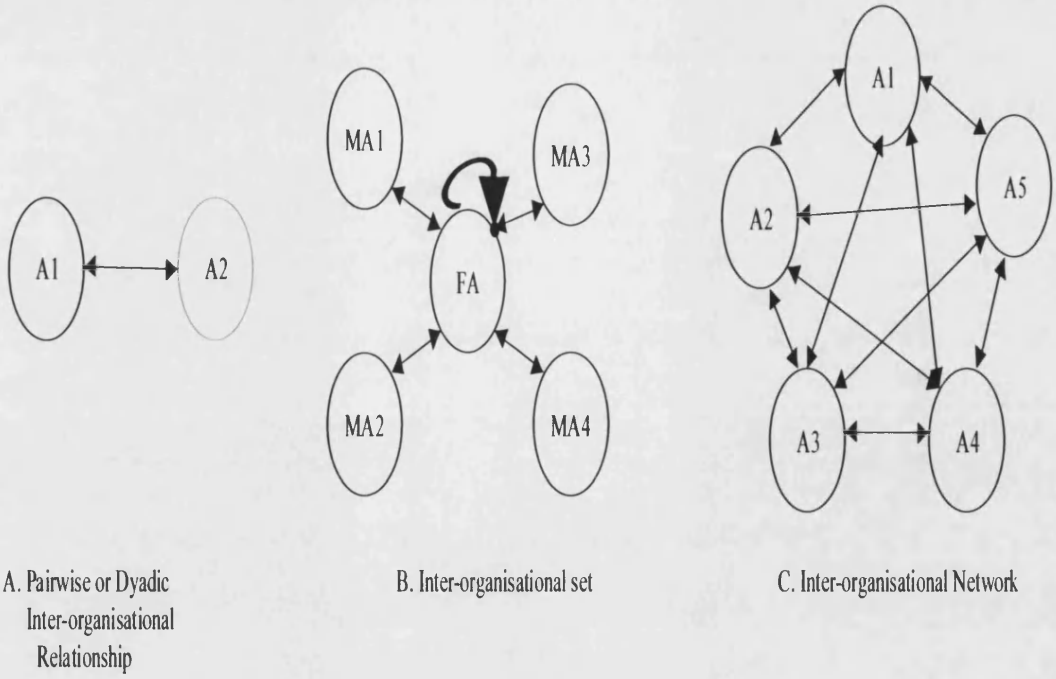

FIGURE 2.1. Forms of Inter-Organisational Relationships.
Source: Van de Ven and Ferry L D (1980), "Measuring and Assessing Organisations", New York: John Willey, p.298.

The inter-organisational set idea was derived from Merton's (1957) analysis of role set, and subsequently Evan (1966) and Caplow (1964) introduced this idea into the literature. The emphasis is on a focal agency and its dyadic relationships with other organisations. As Van de Ven and Ferry (1980) note, it is possible to trace the impact of changes in one dyadic relationship as they affect other pairwise relations within the set.

Aldrich (1979) has introduced a variation on the organisational set, the action set, which is composed of "a group of organisations formed in a temporary alliance for a limited purpose" (p. 280). According to Aldrich, "action sets may have their own formalised agreements, internal division of labour, behavioural norms vis-à-vis other organisations, and clearly defined principles for the recruitment of new members" (p. 281).

Inter-organisational relationships in networks consist "of all organisations linked by a specific type of relation, and are constructed by finding the ties between all

organisations" (Aldrich 1979, p. 281). Van de Ven and Ferry (1980) defines the network as "the total pattern of interrelationships among a cluster of organisations that are meshed together in a social system to attain collective and self-interest goals or to resolve specific problems".

2.1.3. SUMMARY

The advent of IT has helped small firms to transform their organisational structure from the entrepreneurial form to the flex-firm form. What mostly distinguishes the two forms, according to Toffler (1990), is that flex-firms uses IT at the production level extensively. Otherwise, flex-firms are profoundly anti-bureaucratic with an informal structure relying on the high degree of trust existing in the family-based organisation, as in the case of the entrepreneurial form.

The federal form allows small firms to ally together, and thus create size that enables them to get clout in the market place. Building trust is a vital element for the successful operation of a federal organisation and much depends, as Handy argues, on the managers' ability.

The network form is explained in different ways in the literature. In this research, it is relevant in three ways. First, as regional networks which are formally independent but highly interdependent organisations, carrying common norms and values, which are not let by hub organisations. Second, as industrial networks, which are defined as a complex array of relationships between firms that are involved in manufacturing activities. Third, social networks are also relevant as this form of network will allows us to later examine social impact.

Finally, in the literature there is a general agreement that a network is an organised system of relationships. Such relationships can be developed on three basic forms: the Pairwise or Dyadic Inter-organisational Relationship; the Inter-organisational set; and, the Inter-organisational Network.

2.2. THE POTENTIAL EFFECTS OF IT IN ORGANISATIONS

The term "information technology" is used to cover all technologies used in the collection, storing, and transmission of information. In the office, facsimile machines, personal computers (PCs), text and data processing, and the like, and in the factory, numerical control machines (CNC), robots, computer-aided-design (CAD), and the like, are now being interconnected with telecommunications to build networks, where production activities are integrated with organisational and management processes (OECD 1989).

Economists regard the advent of information technology as a new techno-economic paradigm. Freeman and Soete (1985) quote that:

> "... the techno-economic paradigm of IT affects the management and control of production and service systems throughout the economy, based on the in ter-connected set of radical innovations in electronic computers, software engineering, control systems, integrated circuits and telecommunications, which have drastically reduced the cost of storing, processing, communicating and disseminating information. It comprises a set of firms and industries supplying new equipment and software, but its development and applications are not limited to this specialised IT sector".

In business, IT is widely viewed as having the potential to be a strategic weapon in different ways: to gain competitive advantage; to improve productivity and performance; to support process innovation; and, as an enabler of new ways of managing and organising (Avgerou and Cornford 1993).

Porter and Millar (1986), and McFarlan (1984) have built on the famous Porter's (1985) five forces of industry competition model to suggest the strategic role that IT can play in limiting and enhancing the competitiveness of a firm. In relation to each of the five competitive forces, it is argued, IT has the following potential:

- for new entrants, to erect or demolish barriers of entry;
- for suppliers, to erode or share power;

- for customers, to lock in customers by creating switching costs and constructing customer information systems;
- to substitute products/services, innovate by building and adding value to new products; and
- in rivalry, to change the basis of competition and collaboration.

Emphasis on productivity and performance focuses primarily on the internal organisation. The example of Ford motors, given by Gooding (1988), about improving productivity and performance clarifies the point. Ford invested in IT in the early 1980s with the intention of maintaining its market share, through good and responsive product design, and reliable product quality and customer satisfaction. Ford's goal was reasoned to depend on driving down costs rather than raising prices or aiming for volume growth. They developed visions on computer-aided-design and computer-aided-manufacturing (CAD/CAM) bringing quality products to the market faster, computer-integrated-manufacturing (CIM) driving costs down and improving quality, and telecommunications enabling the company to get closer to the customer. By 1986, 60% of design work was computer aided, production was planned and controlled based on the just in time (JIT) approach, which included suppliers on the one hand, and dealers on the other. Suppliers and customers were now using stock control systems, customer query and vehicle locator facilities and point of sales and finance contract routines based on terminals connected into the Ford network.

The automational impact of IT has long been understood in manufacturing, in the province of robotics and computer-numerical-control machines (CNC). This was empirically demonstrated in a study by Lynch as early as 1976. The results of the study are reproduced in figure 2.2. It shows the relation between cost and output with three technologies: computer-based, dedicated, and manual technology. The savings afforded by computer-based technology are indicated by the shaded area. The effect of recent developments is to expand the shaded area, by pushing the curve downward and to the left permitting quick and inexpensive shifts from one product to another within a family of goods. Effectively, firms are able to achieve economies of scope without loss of economies of scale.

On the contrary to the automational impact, Zuboff (1988) emphasises the informational impact of IT and argues that the most significant benefits do not come from automating a process, but from augmenting it. IT can be used within a process to capture information, which can then be analysed by people or by other information technologies. Zuboff's best-known example of the informating role of technology was in a paper mill, in which operators used computer-based tools to capture information on resource and energy consumption and then tried to optimise consumption levels based on the data and their expertise.

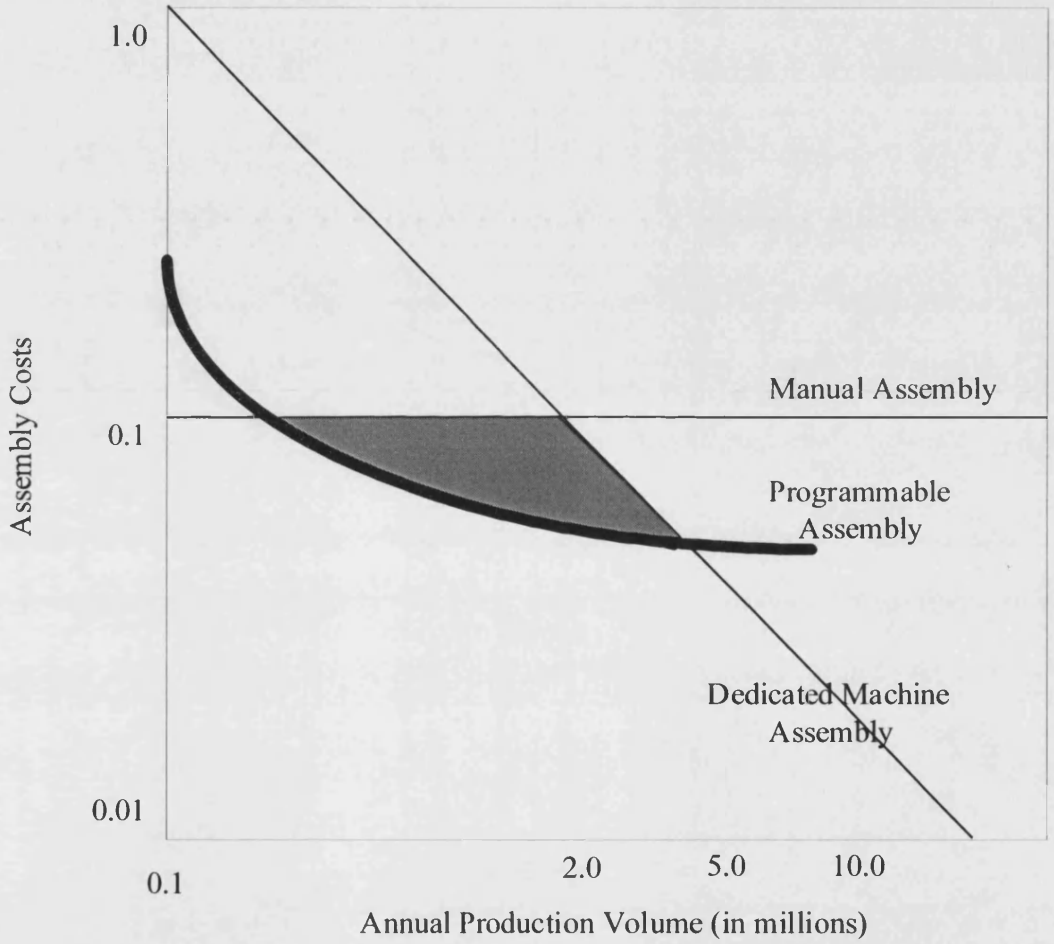

FIGURE 2.2. Comparison of Assembly Costs as a Function of Annual Volume

Source: Lynch Michael Paul (1976), "Economic-Technological Modelling and Design Criteria for Programmable Assembly Machines", Ph.D. diss. Massachusetts Institute of Technology, figure 6.2, p.129.

Zuboff's study also shows the significance of the human capacity to handle information which can permit more data to be incorporated in and analysed during decision-making process. Birchard (1990) cites the example of Phoenix Mutual Life in the insurance industry to argue for a sequential impact of IT. Through a sophisticated computer system for workflow, the company managed to create from a totally sequential, a parallel re-configuration around the bottlenecks such as vacation employees. This new approach allows the firm to issue an estimated 70% of its policies overnight.

Davenport (1994) reports other impacts of IT such as tracking, integrative, intellectual, and disintermediary. Tracking occurs notably in the transportation and logistics industries. Davenport, however, gives an example in a non-logistical process. Johnson & Johnson employs a database that enables executives to track the process of drugs through the research and development process. Knowing the status throughout the pipeline permits the firm to avoid bottlenecks (e.g. too many drugs entering the clinical trials phase at once) and eliminate drugs that show less promise at particular points in the pipeline.

The integrative impact stems from the potential of databases to store information and spread them throughout the organisations consolidated in desktop workstations. Thus, highly segmented tasks across many jobs are moving to a "case management" where an individual or team can deal with all aspects of a product or service involved. This approach is used in the telecommunications industry for circuit provision, in insurance for policy underwriting, in banking for commercial loans, and in hospitals for patient care management (Davenport 1994).

The intellectual impact enables firms to make expert knowledge available across the entire firm. Steward (1991) gives the example of American Airlines which attempts to build a database of customer service practices and procedures that can be accessed by customer service representatives at any airport. Likewise, the disintermediating impact of IT is invariably useful in connecting buyers and sellers and helping them exchange information about purchase transactions.

The 'enabler' role of IT in managing and organising has also been demonstrated extensively in the literature. One of the most influential studies is Scott-Morton's (1992) classic study "Managing in the 90s" where six major categories of impacts are listed:

- IT is enabling fundamental changes in production, co-ordination, and management work;

- IT is enabling the integration of business functions at all levels within and between organisations, and, in some instances it is enabling value-chain substitution (via partnerships, alliances, and subcontracting) and the creation of electronic markets;

- Changes in the degree of inter-relatedness, introduced by IT, are causing shifts in the competitive climate in many industries, which in some cases are influencing simultaneous competition and collaboration, and in others are influencing the development of industry standards;

- IT presents new strategic opportunities;

- Successful application of IT will require changes in management and organisation structure; and,

- A major challenge for management in the 1990s will be to lead organisations through the transformation necessary to prosper in the globally competitive environment.

Wide views have appeared in the literature on how organisations transform and function with IT. In the IFIP WG8.2 Working Conference in August 1994 these views were classified into four categories:

The first one was advocated by a number of authors (Ciborra 1994; Kraft and Truex 1994; Willcocks and Fitzgerald 1994; Janson and Taillieu 1994; and Hales et al. 1994)

who argue that the transformation in organisational structure and culture may be facilitated by advances in IT. In turn, they call for changes in the way organisations develop and operate their information systems.

A second group of authors (Alt et al. 1994; Korpela 1994; Davies and Mitchell 1994; Douzou and Legare 1994; and Introna 1994) argue that there seems to be considerable scope for organisations to take advantage of advanced information technology and information systems to support new emergent forms of organisation. Exactly how to set about such a transformation is not at all clear.

Mumford (1994), Klenke (1994), Wilson (1994), Jones (1994), and Bjorn-Andersen and Turner (1994) argue that in order to use IT to facilitate organisational transformation, there clearly needs to be a high level of fit between the technology and the information requirements of the organisation undergoing transformation.

A final group of authors (Li and Gillespie 1994; Qureshi and Cornford 1994; Zimmerman et al. 1994; and Nance and Sessions 1994) advocate that applications of IT support new organisational forms.

2.3. PERSPECTIVES ON ORGANISATIONAL CHANGE

As it has been seen so far in this chapter, it is believed that information and communication technologies enable the transformation of small organisations from the entrepreneurial to other forms of organisation. Over the past few decades a range of models have appeared in the information system literature (Wilson 1992) giving different perspectives on the process of change.

A number of models presume that managers are the primary source of organisational change, and that these actors deliberately initiate and implement changes in response to perceived opportunities to improve organisational performance or "fit" with the environment. Such models include force field analysis (Lewin 1951), contingency frameworks (Burns and Stalker 1961; Galbraith 1973; Dunphy and Stace 1988; Miles

and Snow 1984), innovation theories (Hage and Aiken 1970, Zaltman et al. 1973; Meyer and Goes 1988), and practitioner-oriented prescriptions for organisational effectiveness (Deming 1986; Peters and Waterman 1982; Hammer and Champy 1993). This perspective is labelled as "planned change perspective".

In contrast to the planned change perspective, the "technological imperative perspective" affords little discretion to managers or any other organisational actors. Technology is seen as a primary and relatively autonomous driver of organisational change, so that the adoption of new technology creates predictable changes in organisation's structures, work routines, information flows, and performance (Blau et al. 1976; Carter 1984; Huber 1990; Leavitt and Whistler 1958).

In the technological imperative perspective there are two school of thoughts. Meyer et al. (1993), Nolan (1979), and Anthony (1964) advocate gradualist models, which posit that organisational change is slow, incremental, and cumulative. In contrast to gradualist models, are the punctuated equilibrium models which assume change to be rapid, episodic, and radical (Gersick 1991). Gersick (1991 p.12) writes that: "relatively long periods of stability (equilibrium) [are] punctuated by compact periods of qualitative, metamorphic change (revolution)". Such punctuated models have informed macro studies of long-term shifts in various industries (Abernathy and Clark 1985; Romanelli and Tushman 1994; Tushman and Romanelli 1985).

Recently, Orlikowski (1996) suggested the "situated change perspective" which proposes change as endemic to the practice of organising and hence as enacted through the situated practices of organisational actors as they improvise, innovate, and adjust their work routines over time. She grounded this perspective in an empirical study which examined the use of a new technology within one organisation over a two-year period. In this organisation, Orlikowski observed a series of changes enacted over time as organisational actors appropriated the new technology into work practices. Change in the situated perspective has been seen as emergent from everyday practice and inseparable from the ongoing actions of the members of organisation.

Henry Mintzberg, one of the most influential contemporary writers on organisations, suggests two types of change: deliberate (planned) and emergent. Planned change refers to the approach which presumes that managers are the primary source of organisational change, and that these actors deliberately initiate and implement changes in response to perceived opportunities to improve organisational performance or "fit" with the environment.

Where planned change is the realisation of a new pattern of organising precisely as originally intended, emergent change is the realisation of a new pattern of organising in the absence of explicit, a priori intentions. Such emergent change is only realised in action (Hsiao and Ormerod 1998; Stebbins et al. 1995; Mintzberg and Waters 1994; 1985). Because they are abstracted from the ongoing-grounded activities of organisational actors, these perspectives on IT-enabled organisational change do not easily account for emergent change. Yet, the notion of emergence is particularly relevant today as unprecedented environmental, technological, and organisational developments facilitate patterns of organising which cannot be explained or prescribed by appealing to a priori plans and intentions.

For the purpose of this research the distinction made by Mintzberg and Waters is adopted. Planned change is taken as it is defined by both Mintzberg and Waters and the other writers. The emergent change perspective is taken to cover as much the situated change perspective as the technological imperative perspective. They are different, however, in terms of emergent cause. Technological imperative emerges by the development of new technology-based information systems which hardly requires any other effort, while the situated perspective emerges from the every day practice of the actors who are trying to make sense in an organisation.

Finally, Zuboff (1996) gives a different view on the debate of "change". She points to a contemporary absence of "moral leadership" in organisations, and argues that attempts at "changing" organisations have focused on re-engineering, downsizing, and obtaining operational efficiency. She concludes that as long traditional assumptions

about work and control are repackaged in new ways, informated organisations remain illusory.

CHAPTER 3

Flexible Specialisation and IT/IS

In this chapter the concept of flexible specialisation (FS) is introduced. Subsequently, three classical cases of FS based on SME organisations are reviewed. The chapter concludes with organisational and IS/IT issues of particular interest for this research.

3.1. INTRODUCTION

In recent academic literature a great deal of attention has been given to post-fordism which is perceived as a new social and organisational form. Beniger (1986) lists seventy-five different theories of social and organisational transformations which have been proposed in the past forty years. Flexible specialisation (FS) is one of them. FS is considered to be a competitive socio-economic strategy, and has been successfully implemented in a number of prosperous regions.

The implementation of the concept of FS can take a variety of forms in terms of participating companies and institutions as well as their relationships. In several regions where FS has been applied, SME's (small to medium enterprises) have

formed consortia where management processes are co-ordinated jointly while each SME specialises at the production level. ISs are seen as integral not only to the formation of the new organisational entity (the consortium) but also to the whole organisational development.

However, the flexible specialisation theory has not been concerned directly with questions of organisational change and ISs. Rather, these aspects are deduced from writings on a variety of other socio-economic issues. Before reviewing the literature on FS the general conceptual background of socio-economic ideas, of which FS is a part, is examined briefly.

3.2. FROM FORDISM TO POST-FORDISM

Fordism refers to a virtuous circle of capital accumulation based on balanced growth between production and consumption (Jessop 1992). This is achieved through productivity increases based on economies of scale, rising wages tied to such productivity increases, rising mass demand fuelled by rising wages, increased profits due to increase demand for mass consumer goods, increasing investment in improved capital goods, a further round of productivity growth and so on. Jessop further notes that Fordism requires a mode of social regulation, including monopoly pricing, institutionalised collective bargaining, and a welfare state system generalising norms of mass consumption.

Increases in productivity, defined as output per unit input, depend on increasingly specialised or product-specific use of resources. This idea was developed by Taylor, in the beginning of 20th century, into a management theory, known as "scientific management" or Taylorism. Taylor also believed that working methods should be standardised and that there was only one best way of doing work, which could be "scientifically" established. Functional specialisation and work simplification are needed, and decision-making should be taken away from the workers and be centralised in a factory planning office (Ayres 1992).

Brooks and Maccoby (1987) provide a summary of the five main organisational assumptions of Taylorist management, as follows:

- the most complex manufacturing enterprise can be organised and structured hierarchically into independent functions, tasks and sub-tasks;

- the most efficient method of management is to subdivide labour as indicated above and train workers to specialise in one and only one task or task element;

- there exists one unique "best" way to accomplish each task, which can be discovered once and for all by experimentation and analysis;

- boundaries between management levels and functions must be sharply differentiated. Tasks must be formally codified and reduced to "work rules";

- managers have absolute control over all aspects of work organisation, including technology choice, investment and location.

Taylorism was introduced in Henry Ford's River Rouge complex producing the Model T car, in the 1920s. Ford's factory began taking in iron ore and coal at one end and produced out cars at the other, with levels of standardisation and throughput permitting continuous utilisation of capacity and facilitating the flows of intermediate components. The embodiment of Taylorist organisational elements into the use of dedicated machinery operated by semi-skilled labour to produce long runs of standardised goods in economies of scale (large quantities) enabled further reduction of cost per product drastically (Coriat 1980). Such a method of production is referred as Fordist mass production (Scott and Storper 1992).

The organisational form employed to implement the mass production organisation is known as "machine bureaucracy" (Hales 1993). Technology, in this organisational form, is a distinctive factor and can range from the very simple to the moderately

sophisticated, but not beyond (sophisticated). Use of highly sophisticated technology requires delegation of power to specialists resulting in decentralisation of power which is incompatible with the machine bureaucracy. Nor can technology be fully automated because it remains a machine bureaucracy only as long as unskilled operators are involved in the production lines.

Alongside the organisational principles of machine bureaucracy the management information system is designed to channel information flows up hierarchically to reach top managers in concise summaries of what goes on at the bottom of the hierarchy. It seems to be the perfect solution for the overloaded top managers. However, evidence suggests that this is not the kind of information needed to formulate strategic decision as much as it is "soft", specific information (Mintzberg 1983).

Mintzberg (1983) further emphasises two other dysfunctional aspects of IS associated with the machine bureaucracy organisational form. First, as information has to pass through all the levels before it reaches the top of the hierarchy, not only natural losses take place but intentional distortion occurs too from people at different levels, with "good news" highlighted and "bad news" blocked on its way up. Second, with a rapidly changing environment data is often received by managers too late because of the time needed to accumulate data, to formulate official reports, and to forward them up the hierarchy.

Mintzberg (1983) concludes that the organisational form of machine bureaucracy is suitable and remains the dominant configuration in the fordist paradigm, where there is a demand for standardised and inexpensive products and services, and as long as people remain more efficient than automated machines.

By the late 1970s the Fordist mass production was perceived by many to be in crisis (Piore and Sabel 1984; Schmitz 1990; Scott and Storper 1992). The rise of Japan and some newly industrialising countries increased competition and Western

companies faced difficulty in achieving high enough levels of productivity in order to be able to keep wages (and hence consumption) moving upwards (Scott and Storper 1992). However, during the economic crisis of the 1970s some regions such as the Third-Italy in Italy (Goodman et al. 1989), Baden-Wurttemberg in Germany (Weimer 1990), West-Jutland in Denmark (Kristensen 1989), and many places in Japan (Pyke and Sengenberger 1990), were able to ride out of recession and continue to grow by moving away from the fordist paradigm. Similar case in developing countries, such as in India, Mexico and Peru, are also quoted in the literature (Navdi and Schmitz 1994).

Some of these success stories were easily explained by economists: firms in developing countries or in relatively backward parts of developed countries, took advantage of low wages. However, this was not the case with some of the most prosperous regions, like the Third-Italy, Baden-Wurttemberg, and West-Jutland. One of the most influential theories that has been suggested to explain such cases is flexible specialisation.

3.3. FLEXIBLE SPECIALISATION

The starting point of FS is Piore and Sabel's theory on the "The Second Industrial Divide", (Piore and Sabel 1984). At the heart of their approach lies the claim that the craft production paradigm has always co-existed along with the mass production paradigm, with neither exhibiting technological superiority dominance over the other on grounds of economic efficiency.

Piore and Sabel argue that even during the high noon of mass production, craft production operated in narrow and fluctuating markets to supply luxury goods, experimental products, and the standardised goods for which the demand was too unstable to make the use of dedicated equipment profitable. Craft products thus appeared as a residual category, taking up the markets rejected by mass production. The idea that flexible technology could be made ever more productive seemed

utopian in the light of the enormous productivity increases of mass production.

According to Piore and Sabel flexible specialisation arose to become important because of two main factors. The first was the increasing labour unrest of the late 1960s and early 1970s. This encouraged firms to decentralise their production process, through splitting up their in-house production to geographically dispersed plants, and through putting out aspects of production to subcontractors. This strategy in turn led to the development of a significant number of small, technologically advanced firms, often founded by skilled workers.

The second factor was the changing nature of market demand. As the market for standardised, mass-produced goods became saturated in the 1960s, two developments opened the way to flexible specialisation. First, increased competition (both from other advanced countries and from the newly industrialised countries) forced large firms to cut costs (especially labour and fixed costs - with the strategies noted above). Second, consumers' tastes became more diverse as basic needs were increasingly satisfied, and the resulting market differentiation enabled many "First World" producers to profitably enter market niches for low-volume, high quality goods for which high-wage, high-skill labour was an asset rather than a cost.

Jessop (1992) interested above all in the theoretical issues involved in conceptualising FS, speculates whether: FS is incommensurable, contradictory, complementary, or just a plainly different perspective from post-Fordism. His speculations are driven by his analysis of the four fundamental domains of Fordism: the labour process; macro-economic regimes; modes of social regulation of such macro-economic regimes; and, Fordist patterns of societalisation. He does not reject the idea of FS, but he remains unconvinced by the claims of Piore and Sabel and others (Hirst and Zeitlin 1989) about whether the future lies with flexible specialisation.

Contrary to FS theorists who claim that global capitalism could be organised under

the dominance of flexibly specialised craft production, are the post-Fordist theorists (Amin and Robbins 1990; Amin and Dietrich 1990; Elam 1990; Jessop 1992; Asheim 1992). The whole stream of the post-Fordist theorists forecast that the current observable trends towards FS are more likely to be integrated into a revived mass production system organised under the dominance of a new post-Fordist mode of regulation.

Both schools however, FS and post-Fordist theorists, agree that a future mode of regulation will be organised around the exploitation of new technological possibilities whose field of application extends well beyond the traditional Fordist industrial sector. "It will be organised: around new forms of structural competitiveness in which corporate, local, national, and supra-national innovation systems will play a decisive role; around new forms of corporate organisation which combine financial and strategic centralisation with various forms of dis-integration; around new forms of state intervention in economic and social matters; and around new forms of labour relations and labour markets" Jessop (1992) quotes.

The argument whether FS will be the dominant organised capitalist system of the future or whether FS will be integrated into a revived mass production system is well beyond the point of this research. Of main interest, and the starting point of this research is the common ground that technological innovation shifts the organisation of production into news forms of organisation. In short, FS suggests that pressure from the market and from international competition resulted in new manufacturing methods, using computerised flexible machinery, and new methods of organising production, involving a qualitatively different kind of inter-firm and intra-firm organisation (Pyke 1992).

On the same wave, Zeitlin (1992) quotes "... promotion of such organisation (FS) involves not only a re-orientation of existing policies but also a restructuring of their own organisation ...". Phillimore (1989) reports a potential list of various areas of change in the organisation with which flexible specialisation is associated, that is:

production moves from economies of scale to economies of scope; technology changes from dedicated to flexible machinery; standardised products give way to niche markets; inputs become less energy and material intensive and more information intensive; fragmentation and standardisation of work processes and skills is replaced by task flexibility; managerial hierarchies are replaced by networks; customers and suppliers linkages are closely integrated; and strategy moves from competition by capacity to competition by innovation. However, his work is not accompanied by any analysis or empirical work on these areas of change.

Authors such as Pyke and Sengenberger (1990), Goodman et al. (1989) Becattini (1990), and Brusco (1990) give a number of features of FS: predominance of SME's; geographical concentration; specialisation; close inter-firm co-operation; high degree of trust between employers and skilled workers; provision of collective services through self-help organisations; and municipal government strengthening the innovation capacity of local industry.

In general, FS is an elusive, if not elastic, concept, with no single defining feature (this is a major point of criticism from the post-Fordist theorists). To some, the information technologies used in production is the key factor; to others, it is the smaller size of production unit, or of the production run. Still other analysts focus on the labour requirements (both in terms of skills and of numbers), while some see innovative management as most important.

On the other hand, Castells (1996) argues that such organisational trajectories were not the mechanical consequence of technological change but rather a respond to the need to cope with a dynamic environment. He admits, however, that once change started to take place it was greatly enhanced by IT. A second significant point raised by Castells is that such changes are rooted in the cultural and institutional structure of each society. He supports his argument by citing the case of Korea and China in Asia.

	Mass Production	**Flexible Specialisation**
Size of firm	Large (the corporation)	Scope for small and large
Technology	Specialised dedicated machines	General purpose machines
Labour	Narrowly trained Separation of conception and execution Fragmented and routine tasks Narrow job classification	Broadly trained Integration of conception and Execution Multi-skilled and varied tasks Broad job classification
Management	Hierarchical and formal	Flat hierarchy, informal
Output	High volume Limited range of standardised products	Large and small batch Varied/customised products
Competitive behaviour	Strategy to control market	Fast adaptation to change, innovation
Institutional framework	Centralised	Decentralised Local institutions which fuse competition and co-operation

TABLE 3.1. Principle Differences Between Mass Production and FS (Source: Piore and Sabel 1984).

FS is a concept best understood in juxtaposition to the type of mass industrial production supported by fordism. Table 3.1 outlines the principle differences

between the mass production and FS. What is distinctive from this juxtaposition is the shift toward greater flexibility, with the application of information technologies seen to play a key role. In this shift the use of information technologies (ranging from communication through office automation to production lines) enables organisations to respond efficiently to rapidly changing customer demand. Effectively, firms are able to achieve economies of scope without loss of economies of scale in industrial efficiency, and, thus reducing a fundamental disadvantage of SME's.

3.4. SMES IN THE CONTEXT OF FS

In this section, three well known and quoted classical cases of FS, based on SMEs development are reviewed in order to trace the factors that appear to affect the promotion of FS, as well as to reach some conclusion about the restructuring (if any) of the organisations involved. Definitions and general characteristics of SMEs are provided firstly.

3.4.1. DEFINITIONS AND CHARACTERISTICS OF SMES

The term small and medium enterprise (SME) has a number of different meanings. For example, in Denmark SMEs are mainly companies with fewer than 500 employees, whereas in Portugal the term is used to refer to the large number of family business employing few people (Commission of the European Communities 1991). In some other cases the legal status (as in France) and the ownership status (as in Hungary) are the major classification criteria, while in Germany, the distinction is made between "craft" and "industrial" firms (Loveman and Sengenberger 1990).

Over the years and despite the major contribution made to most economies, SMEs have attracted limited attention from researchers. Most likely, this is a result of the general attitude towards the fordist economic model of development which favours large firms and which dominated most economies, especially the Western countries. However, more recently the significance of SMEs in the Italian (Bigarelli and

Crestanello 1993; Fumagalli and Mussati 1993; Trigilia 1992), the German (Schmitz 1992; Herrigel 1990), the Portuguese (Castro et al. 1994; Matalonga et al. 1990), the Danish (Kristensen 1992), the Spanish (Passola 1990), the Irish (Kelleher 1990), and many other economies stimulated new research interest.

A number of authors offer different typologies to classify SMEs. For example, Rothwell (1986) classifies SMEs into three categories according to the products they manufacture and the markets they serve, as follows: SMEs operating in traditional sectors such as textiles, clothing, leatherwear, footwear, furniture, etc.; SMEs following modern niche strategy for specific market segments through the provision of innovative and often custom built devices, such as scientific instruments; and, new technology-based firms which tend to operate in new and fast moving areas of innovative technology.

Fumagalli and Mussati (1993) suggest a different taxonomy, as follows: 'Schumpeterian' innovative SMEs, recently founded and rapidly growing if the business idea is successful; SMEs in a district, which can be defined as 'Smithians' based on the existence of an inter-firm network, a co-operative structure, and normally a mono-product situation; sub-contracting SMEs, subordinated to the investment strategies of a big corporation; marginal SMEs, autonomously operating in a market niche in industries with lower scale economies and barriers to entry; and, specialised SMEs in particular areas of production, in which they have market leadership (e.g. non-generalised consumption or investment goods).

The organisational structure of SMEs has been extensively described and discussed by Mintzberg in his publications for over nearly two decades (1973; 1978; 1979; 1983; 1987; 1989; 1990; 1991). Small entrepreneurial firms have a very informal organisational structure, a loose division of labour, minimal differentiation among its units, and few support staff. He further argues that small firms make little use of planning and training, while staff specialists are hired on contract when and where they needed.

Age-wise, small firms are relatively young, formed by autocratic and charismatic entrepreneurs who decided to set-up their own business simply because they could not tolerate the control imposed upon them by bureaucracies in which they might have worked (Mintzberg 1973). The owner/manager takes personal control and direct supervision of much of what goes on (Mintzberg 1991). With power in hand and centralised decision-making on all important issues, the owner/manager has a wide span of control and it is not uncommon for everyone else to report to him. There is limited sharing of information which flows informally, likewise work flows do, and this allows high flexibility where the owner/manager is able to take quick decisions (Mintzberg 1979; 1983).

Cromie et al. (1994) emphasises the dominant role of the entrepreneur too and argues that the process of decision-making tends to be highly intuitive and non-analytical, often thriving on uncertainty and orientated to the aggressive search for opportunities. Strategic decision-making is orientated towards the short-term and is focused on reaction rather than anticipation. Generally, strategy reflects the owner/manager's implicit vision, personal beliefs, and judgement, and is an extension of his own personality and leadership.

A distinction is often made between SMEs which are non-family based, and family based firms, with the latter presenting certain idiosyncratic characteristics. Marked differences between the non-family and family based firms concerns management of people, remuneration of family members, and designing and managing the organisation (Cromie et al. 1994; Leach 1991; Toffler 1990).

Cromie et al. (1994) argue that the permanent and solid family-based firm allows relationships to be developed inside the organisation and between insiders and outsiders who frequently prefer to do business with the friendly personnel in a family concern rather than the faceless bureaucrats in a large corporation. Leach (1991), on the other hand, emphasises the strong culture of family-based firms and argues that family-based firms are often torn between the demands for family values

and business principles, with family control becoming more important than business growth.

Toffler (1990) who has been observing the small family-based manufacturing firms developments in several regions of the so called "Third Italy" for a long time reports that power is held by the patriarch or, occasionally, the matriarch, and eventually passes on to a hand-picked relative. The deep sense of ownership existing between family members implies higher motivation, stronger loyalty, and often intensive working hours, Toffler argues. He goes on to suggest that while in non-family organisations decisions are supposed to be impersonal and formalised, in a family environment subjectivity, intuition, and passion tend to govern.

Conflict is another dimension of family-based firms. Levison (1971) reports two scenarios. The most common is the disagreements between father and son (daughter), while a wider conflict scenario occurs when multiple family members are involved. With every one expecting at least equal treatment warfare of gaining power and influence between family members often breaks out.

Information systems in family-based firms operate in a very different way from other types of organisation, non-family based. The family-based nature brings in to the firm an information system that is profoundly anti-bureaucratic, a specific ethic and ideology (Mintzberg 1991) which includes organisational culture, norms, beliefs, and values that knit a disparate set of people into a harmonious and co-operative entity. In such a family environment knowledge and information are shared and this implies less cubby-hole and channels in the organisation.

In general, SMEs tend to use computers as tools and less as communication media. Toffler (1990) quotes the example of the SMEs in "Third-Italy" where the use of information technology is extensive at the production level while above this level everything is informal without any notable use of information technology. Those SMEs have fewer problems in terms of organisational conflicts as few stakeholders

are involved (Heikkila et al. 1991) and have limited resources available to acquire IT (Doukides et al. 1993).

3.4.2. THE CASE IN THIRD-ITALY (ITALY)

The so-called "Third-Italy", extending from the Apennines up to the Adriatic, exemplifies the phenomenon of flexible specialisation. In the "Third Italy" region there are about 50 industrial districts, the population of which does not usually exceed 100,000. Each district tends to be specialised in a particular sector, for example Prato has specialised in textiles, Poggibonsi in furniture, Sassualo in ceramics, Montegranaro in footwear, Modena in machine tools and agricultural machinery, and so on (Trigilia 1992).

All these industrial districts consist of firms presenting the following characteristics:

a. Predominance of small firms. In footwear, the average size of firms is 17 employees, in furniture it is 5.8, and in clothing 5.5.

b. These firms are not isolated competitors. They are in geographical proximity and they are linked together by industry associations, co-operative consortia, and joint facilities. The geographical link is all important. Within each town enterprises have formed consortia through which networks between firms have been established. The consortia play a role similar to that of the administration of a large firm for its component parts. Through these consortia firms have information access on export promotion programmes, market developments, market research, and are also linked to government bodies and training facilities.

c. The firms themselves specialise, some producing particular parts, others assembling, each able to share out production to others if demand exceeds capacity.

d. They also tend to be well equipped, a small workshop of the art machinery,

or the artisans having access to CAD equipment through the consortia.

Furthermore, a particular favourable set of facilitating agencies which ensured that the new opportunities for the development of the SMEs were grasped more rapidly and in a more wholesale manner than in other countries were available (Trigilia 1992; Bigarelli and Crestanello 1993).

The process of technology transfer and application seems to have played a key role in achieving flexibility in this case. Massari and Sallona (1991) report that the regional businesses have been able to meet the goals of flexibility and adoption to changing markets, without adopting massive information technologies. They argue that firms have had an imitative and defensive approach with regards to the process of innovation and there was a lack of awareness of other potential innovation solutions, particularly in the field of production planning and control.

Intra-organisational structure and employment were examined by Roveda (1983). He reports that there appeared to be a move towards a normalisation of some functional units, such as the technical and the sales and marketing departments; where they already existed, they had been reinforced and increased their personnel. In any case these functions are given a greater role in the strategy of the firm, as information technology becomes one of the main items in the strategic decision making process of the entrepreneur and market aspects become critical in the analysis of the effectiveness of production choices.

Other functions tended to be strengthened, such as technical maintenance which, with the introduction of new production information technology, was performed inside the firm, in order to ensure a steadier production process and to diminish lags and breakdowns.

In some cases the increase in complexity and quality of manufactured products due to the technological change, required a stronger and deeper relationship with the customers. It involved not only sale of a product, but also of a certain amount of

know-how on pre- and post-sale.

Also, Roveda reports a general reduction of labour force, as most of the transferred technologies in the manufacturing area were labour saving, especially for blue collar jobs; and the requirement of increased professional skills and qualifications and new professional capabilities and jobs such as technicians and computer programs.

Finally, Roveda argues that the transfer of technology is strongly dependent on the level of organisation of the firm: the higher the latter, the more efficient is the process of acquisition of new information technologies and the quicker is the response and the adaptation of the various organisational functions. When technology transfer was directed towards less structured and organised firms, it was necessary to support the innovation process within the firm by providing some management and organisational consultancy through specialised professionals.

It is widely recognised that the development of flexible specialisation in the Third-Italy was influenced by a particular socio-cultural environment. More specifically, Trigila (1990) argues that a combined Catholic tradition with the prevalence of socialist and communist ideology influenced the development of FS, without any direct political intervention. Trigila further argues that these political subcultures helped to preserve a specific socio-economic fabric characterised by a peculiar mix of traditional and modern elements which promoted the emancipation of politics from civil society. It is difficult to say what particular conditions Trigila refers to because he does not get into a detailed analysis.

3.4.3. THE CASE IN BADEN-WURTTEMBERG (GERMANY)

Baden-Wurttemberg (B-W) is a state of the Federal Republic of Germany, stretching from Heidelberg in the north to the Black Forest and Lake Constance in the South, which has for decades been the wealthiest of the states in Germany with the lowest rate of unemployment, highest exports, most universities and technical schools and the biggest expenditure on research and development (Financial Times 1993).

B-W has a population of 9.5 million people. As a state of the Federal Republic it has its own Parliament, Cabinet of Ministers (with a Prime Minister) and enjoys a great deal of autonomy in its financial, economic and education policies as well as in jurisdiction and internal administration (Gibb 1980). One of its main characteristics is a high share of manufacturing, both in production and employment with 54.4% and 51.8% respectively.

B-W is not a homogeneous economic region. It includes sub-regions with considerable variations of industrial density. The "Middle Neckar" region around Stuttgart is the industrial heartland of B-W; this region will be referred to as the Stuttgart region. In 1989, it had a population of 2.4 million and 2,133 industrial establishments employing 456,308 people (one third of B-W) (Schmitz 1992).

It is this region which is of prime interest of this study, because although the region has no natural resources it has the highest income per head in Germany; the strongest manufacturing base; the highest proportion of small firms within that base, accounting for between 40 to 50 per cent of output; a history of substantial and rapid growth; low unemployment; and a very high export capability (Schmitz 1992).

In contrast with the Third-Italy case, the B-W case is not characterised exclusively as a small firm economy. A different pattern of development is detectable. The development of FS in the B-W is based on the utilisation of skilled labour from local large firms coupled with the policies pursued by the local government and institutions.

Herrigel (1990) assessed the role of the regional government and intermediary institutions and trade unions and argues that the success of firms in Baden-Wurttemberg is based on a system that socialises risk across a broad array of public and private institutions. Small firms do not have to bear the entire burden of (a) developing new technologies; (b) finding new markets; (c) training skilled engineers and workers; (d) raising capital. The costs of specialisation are shared by or

embedded in a thick network of inter-organisational relations, institutions and practices in the regional economy.

The local government believes and practices active innovation policy based on a tripartite model of state, economy, and science (Herrigel 1990). The government has a wide range of policies and measures which are provided through two different ways: on a pan-enterprise and single-enterprise basis.

Programmes designed for single-enterprise support, which rank well behind pan-enterprise support include financial assistance for developing new products or process; putting new techniques into practices; and setting-up technology intensive enterprises. (Schmitz 1992).

Of more immediate relevance of the pan-enterprise support is government support for technology transfer. There is clear recognition that innovation is costly and risky and there are several institutions which provide or arrange advice at various stages of searching for or introducing new processes and products. Schmitz (1992) reports that the "Steinbeis Foundation" which has the multiple task of working on technology policy acts as a centre advising entrepreneurs and providing specialised assistance through its technology transfer centres located throughout the region.

Schmitz further reports that some other centres are attached to Polytechnics which themselves are expected to work closely with local enterprises and to assist with technical and related managerial problems. Thus, there exists a decentralised net of specialised technology support services. Industry contributes in varying degrees to the financing and organising these services. This applies also to the ten technology parks established there.

According to Herrigel's (1987) analysis, inter-firm co-operation is central to the industrial district of B-W phenomenon. To that end, the VDMA, which is the sectoral association of machine tool makers, and its many sub-associations have evolved into indispensable institutions for SMEs. Their aim is to arrange firms'

product palettes so that they do not compete with each other member of the association. They also provide market information, statistics, and legal counselling that firms could only get on their own with great difficulty. More importantly, the specialised associations organise trade shows, arrange for export permits, promote the general exchange of market information and co-ordinate co-operative basic research projects at universities for member firms.

Schmitz (1992) reports another kind of intermediate institution: the chambers of industry and commerce which represent all firms in a sub-region have a significant role in Germany's dual training system in the design and supervision of courses and in the examination of apprentices. The Stuttgart chamber, being one of the largest in Germany, also established a number of specialised training centres to which member firms can send their workers. In addition, it holds numerous courses which help technicians and managers keep up with new technologies and organisational practices. As regards technology transfer, the chamber operates eight innovation consultancy bureaux in B-W.

Trade unions which are organised by industry and not by profession, play a crucial role in the innovation process at the firm-level by warning firms against insufficient organisational adjustments and investment in training, particularly for new skills (Schmitz 1992). Schmitz emphasises that an attitude of co-determination between trade unions and entrepreneurs makes it possible to channel such concerns into management decisions. In return, Schmitz reports, industrial workers enjoy high wages and a short working week of thirty-five hours.

3.4.4. THE CASE IN WEST-JUTLAND (DENMARK)

The West-Jutland case gives a different set of characteristics of FS, compared with the other two cases mentioned above. West-Jutland has never fostered the sort of political consensus that exists in the Third-Italy, which is reinforced by the strong representation of regional interests by trade unions, associations of artisans and other organisations. Nor has it fostered the strong government intervention support as in

the case of the Baden-Wurttemberg. In West-Jutland, the development of FS has occurred primarily within small towns, and the districts have come about more by chance than in the other two cases mentioned above.

Within the area of West-Jutland two districts, Herning-Ikast in garment/knitting and Salling in furniture, which have been developed out of small railway towns, often consisted of less than 5000 people, have demonstrated a rapid economic growth that has been associated with the FS strategy.

With a strong fordist national policy, a fierce price war by the large firms, and vocational training tradition preparing workers for the repetitive tasks of mass production, West-Jutland admirably managed to develop FS. Kristensen (1992) who studied the historical background of this case reports the following characteristics: a craft tradition, strong family and local ties, locally owned firms, least foreign influence, strong tradition of entrepreneurship and self-employment. These socio-cultural conditions survived in the region even while fordism prevailed in the county's economy.

Kristensen discusses also the organisational characteristics of the FS in the region. He argues that strategies aimed at high quality - design conscious - export market, decentralised structure of specialised SMEs, well developed local service infrastructures, both competitive and co-operative philosophies and practices, and industrial relations and wage setting procedures are among the most significant elements, in this FS case.

More specifically, Kristensen writes that these specialised SMEs decentralised the production structure through extensive use of knitwear technologies and "had further increased productivity and flexibility through computerisation". However, he does not give any details how these technologies and computerisation affected the organisational structure.

Co-operative and competitive philosophies and practices exist side by side according to Kristensen's analysis, especially in the organisation of common services such as promotion of exports, collective travel arrangements for exhibitions, and collective purchases of raw materials. He found an unusual mixture of competition and co-operation where most factories carry out subcontracting work for other firms, deliberately copying competitors' products design.

A final significant element of the West-Jutland case is the industrial relations and wage setting procedures. Kristensen reports that wages are much higher than the national average and workers have been given more autonomy in the planning and execution of work. There is a great discrepancy over the procedures of employment from firm to firm. For example, in one firm high trust relations were found, high autonomy in the performance of jobs, and an easy communication between employers and employees, who are linked together in close overlapping family and neighbourly relationships. Another firm has somewhat narrow procedures of labour recruitment through personal ties, tightly drawn restrictions on behaviour, and very strict discipline. Kristensen refers to Maskell's work who found that the industrial districts in West-Jutland have experienced fewer strikes and fewer days of sickness.

3.4.5. CONCLUSIONS

Although the three cases of FS outlined above are different to a certain extent from each other, they demonstrate a number of key characteristics.

Socio-cultural conditions are generally considered to play a significant role in the success of each of the cases. Of these, there are three that seem to characterise all three cases. The first one is the predominance of the small family-owned firms. The second is the existence of craft tradition. It has been suggested that countries or regions and sectors with a strong craft tradition are more likely to adopt FS principles than those steeped in fordist traditions (Piore and Sabel 1984; Lane 1987; 1988). The three classic examples of FS, Third-Italy, Baden-Wurttemberg, and West-Jutland, all have strong craft tradition. The third factor is the culture of strong

family and community ties. This is especially true in the cases of West-Jutland and Third-Italy.

The case of Baden-Wurttemberg best exemplifies the role of macro-economic policy. In this case, the state government has provided a number of incentives in the form of collective services on a pan-enterprise basis, ranging from the development of new technologies, finding new markets, training schemes, to putting new management techniques into practice. The burden is not borne entirely by the firms involved, instead it is broad across a number of public and private institutions as well. Also, trade unions and employers' associations play a key role in negotiating the terms of flexibility and restructuring of the enterprises.

A different pattern of policies in the case of the Third-Italy is detectable. It is based on a mixture of strong regional interests, governmental intervention, and sectoral co-operation. Nevertheless, the positive government policy seems to have played a significant role in this case too. In contrast to the two cases of Baden-Wurttemberg and Third-Italy, West-Jutland developed FS in a directly unfavourable macro-economic policy.

It is interesting to note that government subsidisation of such innovation is at a very low level. But the government studies the effects of such innovation and responds quickly to the requirements for infrastructure institutions, above all scientific and research institutions. Such centres receive only a one-time start-up subsidy from the government. They must gradually become self-supporting through orders from their clients and through shares in successful projects (Christensen et al. 1990).

3.5. ISSUES OF ORGANISATIONAL CHANGE AND IS/IT IN THE CONTEXT OF FS

For the cases of FS reviewed above the advent of IT was a markpoint. This conclusion matches the argument cited by Piore and Sabel's theory of the Second

Industrial Divide in favour of a social transformation, where IT is seen as central to FS. However, there is a lack of clear evidence on the impact of introducing IS on organisational transformation.

The concept of flexible specialisation seems to be driven by two forces, co-operation and collaboration which are at the centre of designing and maintaining such an organisation. Organisational issues are dealt with at three levels, namely; intra-organisational changes, inter-firm relationships, and inter-organisational relationships.

Intra-organisational changes concern the organisational changes that have taken place within a firm. As it can be expected, introduction of IT affects the organisational structure of the organisations. Nevertheless, the three cases and the FS theory reviewed say little about such changes. Kristensen (1992) reports that the West-Jutland organisations exploited IT, but he does not examine further the organisational implications. In the case of the Third-Italy, SMEs involved do not seem to have used massively IT. Rather firms concentrated on the organisation of production along decentralised small firms, with each one specialised internally.

Inter-firm relationships concern the formation and functioning of the consortia and intermediary institutions, focusing on the organisational structure of management and decision-making. The three cases reviewed give no indication regarding which decisions are taken at the consortium or intermediary institution level and which at the individual firm level. Nor is the management process clear.

Inter-organisational relationships concern the links between different organisational units, such as SMEs, consortia, and intermediary institutions. Analysts, such as Brusco (1990; 1986; 1982), Becattini (1990), and Trigilia (1990), point out the presence of various such relationships in the most successful cases of FS. The effectiveness of these relationships needs special attention. Theory, generally, predicts that firms should optimally increase the number of organisations with

whom they do business (Malone et al. 1987). Some empirical evidence, on the contrary, suggests an overall reduction in the number of organisations (Helper 1991; Cucusano and Takeishi 1991; Emshwiller 1991). Analyses of the cases reviewed above ignore this issue. Through process innovation, by exploiting technological possibilities (in the very broad sense), they aimed to increase their competitive position not only on the local but also on the international market. What was instrumental in their success is the enormous potential for innovation, helping organisations achieving major reductions in process cost or time, or major improvements in quality, flexibility, services level, or other business activities. These benefits, however, are a snap-shot of a developed process.

The set of inter-organisational relationships developed in the context of FS influence the process of developing information systems, which in turn depends on a set of interrelated decisions about certain key variables. It is inevitably a strategy formulated in a dynamic environment even if an attempt is made to characterise it at a point in time. However, it is not clear whether there is a relationship between inter-organisational development and use of IT. Nor it is clear which and how particular socio-economic factors may influence this relationship.

The strategy of developing information systems can be defined as a conscious strategy aimed at defining the acquisition, processing and communication of information within the FS organisation. This will include defining how these activities are structured, where decision-making is located for these activities, the nature of participation in decision-making, the relations between decision-making organisations and the overall structure of the FS organisation.

Defined in this way, an information strategy encompasses both electronic and non-electronic information. It defines structures for the management of formal information rather than informal information, though it could conceivably attempt to assess the scope for informal communication within an organisation. While many organisations have information systems strategies base on IT, few have information

strategies encompassing all forms of formal information. It might be argued that overall organisational structure together with business strategy implicitly defines an overall information strategy. However, this does not involve explicit bringing together the overall strands on information strategy - both traditional and electic - into a clear structure. This is particularly interesting in the FS concept where it is argued that it is influenced by the strong socio-economic and cultural conditions prevailing in the cases examined.

Information systems strategies exist in the same dynamic environment as the broader information strategies. It is possible to begin to characterise different IS strategies if the key factors and decisions that determine the nature of the overall strategy are considered. In the cases reviewed, the FS organisation has three key levels, intra-, inter-firm, and inter-organisational. Within each level, various possible structures and levels of authority are possible. This leads to one key question that must be asked of any organisational structure: at what level or levels are business / organisational goals decided? What are the processes and structures of communication and discussion that feed into this decision-making process?

PART II

FOUNDATION OF THE RESEARCH

CHAPTER 4

Research Questions and Method

This chapter starts by refining the research questions. Section two justifies the selection of the contextual approach as the more suitable for this research. Based on the contextual approach a conceptual framework is developed in the next section. The selection and justification of the case study as the research method follows. It discusses the nature and process of the preparatory, empirical, and analytical work on which the dissertation has been based. Finally, it discusses limitations of the research epistemology adopted.

4.1. RESEARCH QUESTIONS

Following the initial statement of intention in the introductory chapter and the literature review in chapters 2 & 3, we are now in a position to define more specifically our research questions.

This research focuses on the analysis of the 'experiment' of flexible specialisation in Cyprus, which is introduced in the next chapter, and explores the relationship

between organisational change and IS development. However, flexible specialisation theory does not provide adequate guidance for the role of information systems. We can assume that this theory driven policy of organisational change did not provide ground for linking information systems development with the desirable change of the organisational form. Therefore, it is anticipated that emergent changes would be more significant. Our interest is not just to identify emergent changes in the FS network of Cyprus, but also to examine the driving forces.

Whilst in the information systems literature there is widespread agreement that organisational change and IS development should be linked or interdependent or even integrated, little evidence exists to show the nature of such interdependency and the ways in which linkages are achieved. The key issue that this study addresses, therefore, is whether such interdependencies can be shown to exist. In particular, it is aimed at providing an understanding between the development of information systems and the organisational changes taking place, as part of the implementing of the FS strategy.

The socio-economic characteristics lying behind flexible specialisation, such as community and family ties, geographical proximity, SMEs' in general and family characteristics, in particular, SMEs approach to the use of IT, and their characteristics explored in the previous chapter also need to be taken into account. For example, the ad hoc way of using information in an informal information system prevailing in a family based organisation is becoming relevant to the issues associated with information systems management and development.

Such characteristics are expected to be expressed in actors' attitude and behaviour towards developing inter-organisational relationships in the FS network of Cyprus. As theory suggests that networking needs a high degree of co-operation and trust, the impact these networks have towards the particular socio-economic characteristics of Cyprus are going to be examined.

4.2. THE NEED FOR A CONTEXTUAL APPROACH

Information systems are complex socio-technical entities (Boland and Hirschheim 1987; Farbey et al. 1993; Hirschheim and Smithson 1987; Walsham 1993), inseparable from the organisational context within which they are situated. Moreover, they are products of history and human agency. The academic discipline of information systems is largely an applied field rather than a pure science (Galliers and Land 1987). It is now well understood that IS should not be considered as a product of the technical or the social aspects alone, but as a result of their interaction (King and Kraemer 1986; Rockart and Scott-Morton 1984; Symons 1990). IS research should attempt to understand them through their interaction with the organisational context in which they are embedded and their role in the process of organisational change (Orlikowski 1992; Orlikowski and Baroudi 1991).

The three FS cases reviewed in the previous chapter suggest that the particular socio-economic and cultural conditions of each case had different impact on the process of organisational change and IS development/introduction, which is the main focus of the current thesis. Thus, 'Contextualism', which is an approach to recognise and understand the context, was selected as an appropriate framework for this research.

The suitability of contextualism in the study of IT-enabled organisational changes has been demonstrated by a number of research studies, such as Farbey et al. (1993), Symons (1991), Willcocks and Margetts (1994). Walsham (1993) merges principles of contextualism with social theories to introduce a rich interpretive conceptualisation for the study of information system. Fincham (1992) and Tsoukas (1994) have successfully used contextualism in the management field to clarify the link between contextualism and interpretism.

Contextualism was introduced by the philosopher Pepper (1942) as one way of providing evidence about the world that can be used to corroborate claims to knowledge. In this respect contextualism is concerned with the event in its setting

(context). A number of methodological approaches to describe the interaction between process and context have been developed such as Checkland's (1981) Soft Systems Methodology (SSM), Kling's (1982) Web Models, Giddens' (1984) Structuration Theory, and Pettigrew's (1985) Contextualist Approach.

SSM embodies a philosophy of organisational intervention that sees different individuals and groups as constructing interpretations of the world. In general, SSM is a well-defined and subtle approach to organisational intervention, with wide application potential across a range of areas within the broad label of management science. It has already been used extensively by a variety of management practitioners in the UK (Mingers and Taylor 1992), including a considerable number of applications in the area of computer-based IS. Web models are valuable approaches to the study of context in the domain of information systems. They draw broad boundaries around the focal computer system and examine how its use depends upon a social context of complex social action. Both, however, SSM and web models, explicitly focus on exploring the different views of problem situations that derive from each different stakeholder's values and beliefs. They give little explicit focus on analysing the bi-directional relationship between context and process. Watson and Wood-Harper (1996) put it in this way, "the general structure suggested by these methodological approaches provide a basis for specific instances of critical inquiry in situations that authors may not even have anticipated".

On the other hand, structuration theory emphasises the complex link between action and structure. One of the principle aims of the theory is to resolve the debate between social theories, which place their emphasis at the level of human agents and human action and the alternative theories which focus on the structure of social systems. Thus, structuration theory looks at the interaction between context and process but focusing on one particular aspect, the human agency. Madon (1991) argues that the real value of structuration theory is in providing a meta-theory within which other theories and methodologies can be contained.

Pettigrew's methodology gives explicit focus to the looped nature of causation between context and process. Pettigrew recognises that problem-solving and decision-making processes in organisations contain elements of 'muddling through' or incrementalism, in addition to rational or goal-directed activity, and argues the case for conducting processual analyses of organisational change. Pettigrew and his colleagues first used these principles in a longitudinal (eight years) study of Imperial Chemical Industries (Pettigrew 1985; Pettigrew and Whipp 1991) and more recently in a study of National Health Service reform in the UK. The study described and analysed processes of strategic change in context, illustrating why and how the content of particular changes and the strategies for introducing them were constrained by and enabled by a number of factors.

Pettigrew's research approach is an attempt to specify some of the language and conditions to link the multilevel (vertical) and processional (horizontal) analysis of organisational phenomena in what he calls a 'holistic contextualist analysis' or 'contextualism in character' (Pettigrew 1985). The vertical level refers to the inter-dependencies between higher or lower levels of analysis upon phenomena to be explained at some further level; for example, the impact of a changing socio-economic context features on inter-organisational context and interested group behaviour. The horizontal level refers to the sequential interconnectedness between phenomena in historical, present, and future time.

Pettigrew's contextualism is particularly appropriate as a methodological basis to expose and explore the nature of interactions between organisational change and information systems development. In our research it enables a detailed exploration of the impact of the context in the process of organisational change and IS development, and contributes to the understanding of the strategic changes required to promote FS strategy. Such understanding leads us to identify requirements for processional (methodological) requirements.

The three basic elements of a contextualist analysis are the process component, the context component, and the outcome component of the process under investigation. A proper explanation of these elements requires the study of the relationship and interplay between the content, the context and the process, which are discussed in the next section.

4.3. A CONCEPTUAL FRAMEWORK

The conceptual framework proposed here (figure 4.1) draws on the literature review (chapter 2 & 3) and identifies the different organisations at different hierarchical levels by using the Pettigrew's levels of analysis.

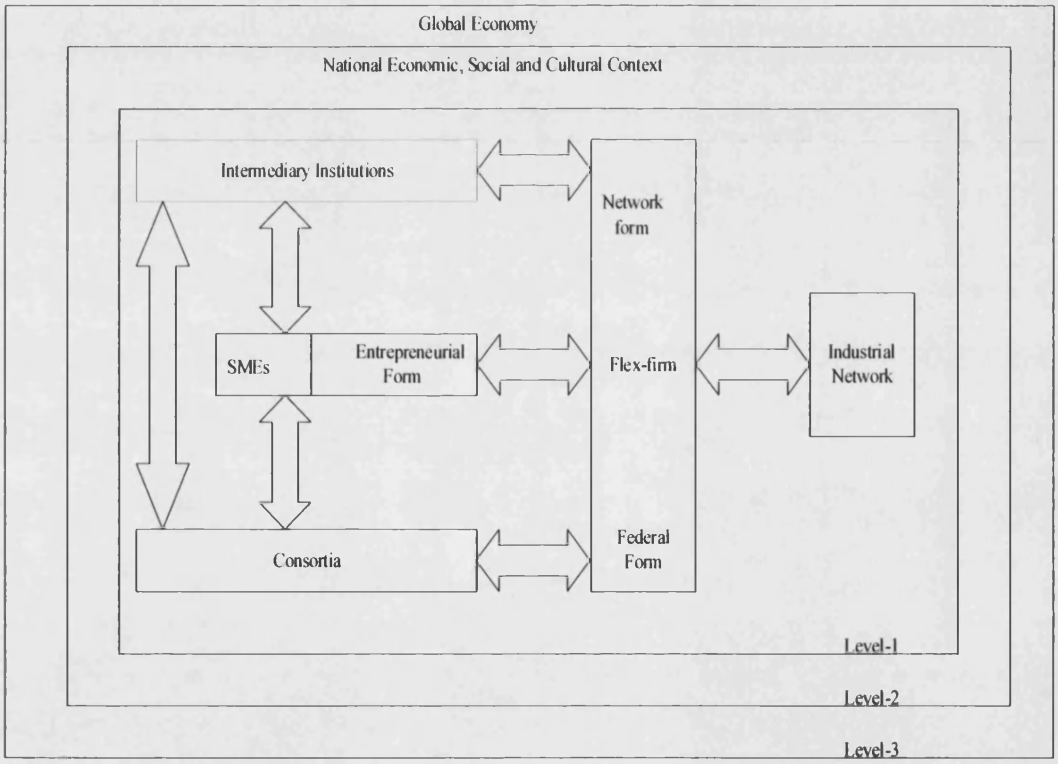

FIGURE 4.1. A Multi-Level Conceptual Framework of Analysis.

4.3.1. THE CONTEXT OF CHANGE

The context in this study involves the national context and the FS initiative. The national context includes factors which are beyond the control of the organisation, that the organisation needs to respond to and accommodate. In the three FS cases reviewed in chapter 3, the particular socio-economic factors (e.g. the national economic situation, government policy, political) and cultural conditions, which could support or repress inter-organisational relationships (Shrum and Wathnow 1988), have been suggested to play a significant role in the process of developing FS strategy. The FS organisational context refers to the organisational units involved: the SMEs; the consortia; and, the intermediary institutions.

4.3.2. THE CONTENT OF CHANGE

The content of change refers to the formation of the FS organisational units, the continuous interaction between them, their evolution and IS development. The growth of inter-organisational relationships has meant that the goals and objectives of the co-operators must be considered too. Here, one may see IT as supporting active and mutually helpful relationships between the organisational units.

Pettigrew (1985) argues that "Formulating the content of a strategic change crucially entails managing its context and process". The importance of the content/context link is in the introduction of the changes in many organisational areas. Thus, these changes should be studied within the whole context (the forces for continuity in the situation).

Another important element in the consideration of the content is who is the source of the values and how these values guide the approach taken in the change process. The content of change incorporates the institutional values and goals which give rise and legitimate the change. How these are interpreted, formally and informally, has significant impact on the way that the change actors behave. In other words, it

impacts the change approaches introduced, how the process of change unfolds over time.

4.3.3. THE PROCESS OF CHANGE

The process of change refers to the way the change is performed and how the issues related to it are perceived. The way in which change is driven, initiated, and implemented (planned or emergent), the way it plays itself out over time, and the results of the change are placed in the foreground. It includes perception of all relevant stakeholders (e.g. SMEs owners/managers and policy-makers) throughout the process of change.

The process is clearly determined by the context within which it is performed by the cultural and institutionalised behaviour of the change participants (i.e. the way in which they perform their roles). In this respect, process mediates between the change content and context. The content/process relationship influences the outcome of the change exercise and consequently its perceived success and impact.

4.4. SELECTION OF THE CASE STUDY APPROACH

This research aims at achieving detailed understanding of a complex phenomenon, in its social context. In the case of flexible specialisation the interests and perceptions of the stakeholders may differ and sometimes be conflicting (Christensen et al. 1990). The relationship of organisational change and information systems development involves such different perceptions and can be better understood by an interpretive approach.

Research in organisations leads us to consider methods appropriate for natural setting research, that is; case studies, action research, field studies, and field experiments, (Wynekoop and Conger 1991). Galliers (1992) labels the last two as "hard" research methodologies following the positivist tradition, while the first two are labelled as "soft" methodologies following an interpretive approach. The case study and action

research are increasingly employed as "soft" research methodologies (Orlikowski and Baroudi 1991) because of their strength to consider the process of the mutual influence between information technology and its context, enabling the researcher to capture reality in considerably greater detail and to analyse a greater number of variables (Walsham 1993).

The case study method is a useful tool to describe relationships that exist within and across organisations (Galliers 1985), understand processes and changes (managerial and organisational) over time, and to answer questions in the form "how" and "why" about a contemporary set of events over which the investigator has little or no control (Yin 1994; Wynekoop and Coger 1991; Benbasat 1984) and thus no experimental control or manipulation is exerted.

In action research, in contrast to case study, the researcher is directly involved and participating in the research under study (Gallier 1992), but simultaneously wants to evaluate a certain intervention technique (Benbasat et al. 1987). For this research, however, the action research method is not considered to be feasible because the researcher is not a participant, but rather an observer who tries to 'get inside' the situations.

The case study was selected as the most appropriate method for the problem under investigation since all the characteristics suggested fit neatly in this case. Furthermore, methodologists in social science (Glaser and Strauss 1967; Yin 1994) and in information systems (Galliers 1992) argue that the case study method is especially useful in situations where no exact measures of the variables of interest have been developed and where the experiences of the actors are important and the context of action is critical.

The case study method has been adopted for this research to provide a deep understanding of the complex context of flexible specialisation development. The

case study method is suitable because research in the flexible specialisation context from an information system perspective is at an early and formative stage which does not justify rigorous hypothesis, and thus the research questions are relatively broad focused.

The next issue concerns the unit of analysis and the concomitant number of situations to study. In determining the unit of analysis, Benbasat et al. (1987) suggests that the researcher should closely examine the research question which often gives a good indication of an appropriate unit of analysis. Lee (1999) quotes: "A study's unit of analysis is the phenomenon under study". Thus, in this research the unit of analysis is taken to be the industrial network.

In chapter 2, three forms of inter-organisational relationships have been mentioned: namely, dyadic inter-organisational relationships; inter-organisational set; and, inter-organisational network; (Van de Ven and Ferry 1980). In this research the inter-organisational network is the main concern because it focuses on the whole network. This expands the scope of the research in order not to neglect the potential influence factors which are context specific, such as the variety of demands of other actors involved or the complexity of the competitive environment (Van de Ven and Ferry 1980).

The dyadic inter-organisational relationship form would be appropriate if the main focus of the research was to examine research issues within a particular relationship. On the other hand, the inter-organisational set would be an appropriate approach if the main focus was to examine the relationships of organisations with a focal organisation (Evan 1966), and thus explicitly classifying the status of relationships depending on their roles and linkages in the industrial network.

4.5. DETAILED RESEARCH DESIGN

The bulk of this research concerns the detailed and in-depth study of the formation of organisational units in Cyprus, the organisational changes this involved and the information systems developed to support their operations and management.

Research was also conducted in Emilia-Romagna to provide a basis of comparison of information systems in the context of FS. The Emilia-Romagna case, which is regarded and quoted in the literature as a 'successful' FS model provides a point of reference with regards to inter-organisational relationships development within an industrial network. Furthermore, some cultural differences between Emilia-Romagna and Cyprus societies are examined to provide additional explanations on cultural aspects. Unlike the case study in Cyprus, which followed developments from the formation of organisational units until today, this was a study at a particular point in time.

4.5.1. MULTIPLE CASE STUDIES DESIGN

The case sites were selected on the basis of the research interests and conceptual framework (Eisenhardt 1989). This permits what Glaser and Strauss (1967) call "theoretical sampling". Taking this principle further Yin (1994) proposes two criteria for selection: cases where similar results are expected for 'literal' replications and cases where contradictory results are predicted to achieve 'theoretical' replication. Likewise, Pettigrew (1985) suggests that research case sites should be chosen to present polar extremes that enable comparison across important aspects of the phenomenon under investigation. The selection of multiple case sites allows a cross-case analysis which increases and enhances the generalability of results and consequently the validity of the research. Furthermore, the achievement of deeper understanding and explanation is feasible (Miles and Huberman 1994).

Before the case studies were conducted exploratory field interviews were carried out at both the macro and micro levels (see Appendix I). These interviews were held in

parallel with the literature review. The purpose of this was to further interpretation and understanding of the literature, the exploration of the practical issues related to the research theme, as well as to generate valid interpretive input and guide the empirical research that followed.

Taking into account the organisations involved in the flexible specialisation configuration, and the methodological guidelines, the selected case sites aimed to facilitate cross-sectoral comparison between consortia, intermediary institutions, and SMEs. Contradictory results were expected between different types of organisations as well as within sectors because of the different nature of tasks to be performed and thus leading to different technological applicability.

Four consortia were selected for study from two different sectors; metal-working and furniture. Two of them were set-up based mostly on the guidelines given in the UNIDO/UNDP report, the third one was set-up later and was based on the experience accumulated from the operation of the two, while the fourth was set-up a decade before the introduction of flexible specialisation.

As a result of the SMEs engagement in the consortia, dependencies between SMEs emerged. Twenty SMEs involved in the above consortia were studied. SMEs differed in a number of respects, such as: different sectors, background (craft, small firms), extent and type of business, technological capability, management and organisational size and style.

The final type of organisations studied was the intermediary institutions. Two case sites were studied: the first one is the organisation acting as the information centre to the whole manufacturing industry in Cyprus, providing horizontal services; while the second organisation provides specific services to the textile and clothing sector.

Similar type organisations were studied in the FS network of organisations in Emilia-Romagna. In terms of sectors, these organisations were concentrated in the textile and apparel, ceramics, agricultural machinery, and construction industry, while in terms of specialisation were in industrial machinery diffusion research and development, information, and economic development. This part of research, however, deals only with the organisational complexity of flexible specialisation for comparison purposes with the main empirical work conducted in Cyprus. The empirical work in Emilia-Romagna lasted for a month and took place in April 1996.

Empirical work in Cyprus was conducted into two steps. Starting with a pilot case study and subsequently following up the rest. The pilot study helped to refine data collection plans with respect to both the content of the data and the procedures to be followed.

4.5.2. DATA COLLECTION AND ANALYSIS

In order to obtain a rich set of data for the issues under investigation, the case study method uses multiple methods for data collection (see Benbasat et al. [1987]). Initially, apart from reviewing all the existing documents on the FS "experiment" of Cyprus, contacts were established with the national policy-makers, the Cyprus Development Bank, the two intermediary institutions studied, the consortia involved, as well as a number of SMEs. At that stage several informal meetings and interviews were held with all the parties concerned for two reasons. First, to test the feasibility of using Cyprus' "experiment" to carry out the fieldwork, and second, to develop interview techniques.

The informal meetings and interviews were very useful in determining the questions to follow for the subsequent main research. At that stage it was felt that very open-ended questions were causing endless replies with a lot of irrelevant data. Thus, it was decided after an open-ended question to be specific on the issues/areas relevant to the question to be discussed. This, however, needed the interviewer to act intuitively

during the interview to clarify vague points made by the interviewees. Questions like "how?", "why?", "when?", "what else?" were found particularly useful. In contrast, long questions caused interruption of thoughts and shifted the discussion leaving important issues untouched.

In the light of these 'difficulties' in ensuring reliability of data a protocol was decided to be designed and used. The goal of reliability is to minimise errors and biases in the study, as well as providing a solid documentation of procedures leaving no suspicion to reviewers. The protocol has three main sections, namely; procedures, case study protocol and issues to be discussed, and analysis plan and case study reports. Following this path of preparation to conduct case studies forces the investigator to anticipate several problems, including that of how data can be analysed and more generally of how the case study reports might be completed.

The first section, procedures, provides the sources of preliminary preparation and the organisations and persons with positions held selected to be interviewed. With regards to the former four sources were used, namely: documentation, archival records, interviews, and physical artefacts. However, the most important and valuable source of information in this study was personal interviews. In particular in the case of the SMEs where hardly any other source was available. This reflects in essence the flexible climate within these organisations. In all cases the owners/managers were the key informants. This was found particular useful since they were the persons able to answer and discuss all the questions and issues concerned.

The heart of the protocol is the second section where the issues to be discussed and questions to be asked are included. Structurally, this section is divided into levels according to the issues investigated, i.e. inter-organisational, inter-firm, and intra-organisational. The order of the issues/questions within each level are based on the chronological order of events taking place, while issues and questions concerned with opinions, perceptions, and vision follow.

The third section of the protocol, which deals with the case study report and analysis, is how chapters 6,7, and 8 are structured in this thesis. Thinking in advance about case study report helps in the process of data collection to be collected in a kind of order and not overwhelmingly. The structure of this section, however, remains flexible and it is encouraged to remain so (Yin 1994) until the case study is finalised.

None of the people approached declined to be interviewed. People were interested in the topic and dedicated much time in answering and discussing. Data collection in Cyprus was conducted in two phases, a pilot study and the main study. The Pilot study involved the AtoZ consortium and its 12 SME members and took place from April to September 1993, while the main study occurred eight months later (June 1994 - November 1996). Sixty-five interviews of 1 - 3 hours in length were conducted across the two phases. Both phases involved the use of open-ended and semi-structured interviews in order to allow participants to give their personal experience and interpretation of the events. All the interviews were tape-recorded for back-up. However, the main method used in the interviews was taking notes. The preliminary findings were shared with some of the interviewees and they provided helpful comments which confirmed and elaborated the identified issues and themes.

The empirical work in Cyprus lasted from April 1993 to November 1996. The empirical work in Emilia-Romagna was conducted in April 1996. The first and second parts of the protocol used are on Appendix II.

4.6. LIMITATIONS OF THE RESEARCH EPISTEMOLOGY

For this research the Pettigrew's contextualist approach has been used. When Pettigrew applied his model to conduct a 9-year period study in the UK-based chemical company ICI, he was criticised on two major points:

- first, not explicitly is defined the way in which power is welded between various interest groups; and

- second, not enough emphasis is placed on the linkages between what Pettigrew calls the outer and inner contexts.

The nature of the research questions (section 4.1) compensates both criticisms. They imply strong linkages between the contexts and processes in order to understand how agents bring certain levers to influence decisions in the process of organisational change and IS development.

Orlikowski and Baroudi 1991; Walsham 1993; 1995; and Walsham and Waema 1994 argue that interpretivism has its own deficiencies. Orlikowski and Baroudi (1991) summarise the weakness of interpretivism as follows:

- first, lack of consideration of the external conditions that give rise to meanings and experiences;

- second, neglect to explain historical change by systematically ignoring structures of conflict within the society which generate change;

- third, structured conflicts within an organisation and contradictions are ignored; and,

- fourth, omission of any explanation of the unintended consequences of actions.

In order to address the first weakness of interpretivism particular emphasis is given to study the influence of the socio-cultural conditions on the process of organisational change and IS development. Furthermore, socio-cultural conditions were not snapped at the particular time of the fieldwork. Instead, they were viewed in their historical development, [e.g. by using the concept of time (Trompenaar 1994) to explain the opportunistic behaviour of the Cypriots in conducting business].

The fieldwork was conducted in Cyprus, a small country with a rather uniform culture. Everyone knows and has access, if not directly, through a third person to others. These conditions acted as factors which minimised the second weakness of interpretivism, that of mis-interpretations. The adopted method of cumulative research building gradually on previous findings and the longitudinal approaches was an additional factor to minimise mis-interpretation.

With regard to the third point of interpretivism's weakness, structural conflicts within an organisation and contradictions, Pettigrew's contextualist approach, used in this research, guides explicitly how to overcome this weakness. In such cases the researcher's tactic was twofold: first, asking wider and deeper questions on the issue in order to lead the case in a more elaborate discussion; and second, in the analysis stage to cross check such contradictions with other facts of the fieldwork. For example, the owners/managers of the larger SME members of the consortium complained that the smaller SME members benefited disproportionally through the consortium, while the owners/managers of the smaller SME members of the consortium complained that the bigger SME members took all the decisions with regards to the consortium operation in their favour. At the same time it became known that all SME members of the consortium sustained growth since they joined the consortium, while the owner/manager of an SME member said "I do not care if this consortium survives or not since all the money I have earned has been invested in other economic activities". This led the researcher to link this situation with opportunistic behaviour in conducting business. Overall, particular attention was given to show how the current situation under investigation emerged, reflecting the social and historical background of the research setting (Klein and Myers 1999).

The last weakness of interpretivism, which is associated with the second Pettigrew's criticism, was tackled within the general approach adopted to conduct this research. As all the above weaknesses were known in advance, experience and recommendations from previous interpretive studies [e.g. Farbey et al. (1993),

Symons (1990), and Walsham (1993; 1995)] were taken into account to overcome them. A particularly used method is the adoption of cumulative research, which builds gradually on previous findings and longitudinal approaches. In addition, the research design (see section 4.3) was carefully developed.

A final limitation of the research epistemology adopted for this thesis is triangulation of data. The need for triangulation arises from ethical need to confirm the validity of the process. A number of researchers have used qualitative and quantitative methods in order to achieve triangulation (Jones 1997; Gallivan 1998). However, in this research the following have been adopted to achieve triangulation.

- the data, theories and methodologies used is triangulation (Snow and Anderson 1991);
- the protocols that are used to ensure accuracy and alternative explanations are called triangulation (Stake 1995).
- the multiple sources used in the collection of data in case studies is triangulation (Yin 1984).

In fact, the problem in case studies is to establish meaning rather than location (Tellis 1997).

4.7. SUMMARY

Organisational change and IS development is a social phenomenon which can be studied better by adopting an interpretive epistemology. An interpretive approach was chosen as an appropriate method for studying a contemporary phenomenon occurring within a real-life inter-organisational context. The study and analysis of the empirical work is based on the theory of contextualism, which encompasses the context, content and outcome components.

In conducting the empirical work, the method of multiple case studies was adopted in order to maintain validity and reliability of findings.

CHAPTER 5

The 'Experiment' of Flexible Specialisation in Cyprus

Based partly on documents, reports and interviews conducted at all levels, the flexible specialisation strategy in Cyprus is presented in this chapter. It is argued that Cyprus has a number of features which favour the FS strategy.

5.1. HISTORIC AND ECONOMIC BACKGROUND

Cyprus gained its independence from the British in 1960. The elected government had to face the aftermath of prosperity and depression from the previous decade - a growing urban population, rising unemployment and emigration, a declining national income, inflation instability, capital flight and an increasingly serious balance of payments problem. To tackle these problems, a long-term view was taken emphasising education and infrastructure projects.

Between 1960 and 1974, the annual growth rate attained was estimated at about 8.5

per cent. Particularly, manufacturing value added rose by more than 50 per cent. Still it was accounting for little more than a tenth of Gross Domestic Product the (GDP) and only a fifth of commodity exports. After the Turkish invasion, in 1974, the Cypriot economy lost 70% of the previous gross output (Weiss et al. 1980).

Soon, however, the economy of Cyprus [1] managed to be fully reactivated. GDP reached pre-invasion levels in 1977, the conditions of massive unemployment were eliminated, and full employment prevailed by 1978. This success is attributed to factors related to the high quality of the labour force, both of entrepreneurs and employees, as well as its flexibility and timely adaptability to changing conditions. It is also attributed to the devotion and the sense of self-denial of the people of Cyprus in general and the refugees in particular, the acceptance by the Trade Unions of a voluntary reduction of wages and salaries of 25 per cent, and the decisiveness and dynamism of Cypriot entrepreneurs who exploited the opportunities that came their way.

Between 1975 to 1985, the country's real GDP grew by 121 per cent with manufacturing playing an important part in the overall growth, contributing 18 per cent to the increase of value-added over that period. Manufacturing development had benefited greatly from a high level of protection; tariffs were generally very high, quotas were imposed, and some imports were totally banned. Value-added contribution by sector was presenting a relatively uniform picture, as follows: food-processing 21 per cent, clothing & footwear 25 per cent, furniture 10 per cent, metal-working 12 per cent, non-metallic mineral products 13 per cent, chemicals 9 per cent, paper and printing 7 per cent, and others 3 per cent (Industrial Statistics 1990).

In 1986, for the first time since 1974, manufacturing value-added fell. Cyprus almost completely failed to diversify in both export products and markets over the past decade. Despite successes in some markets, government's marketing efforts have remained inadequate. For the most part, manufacturers seek markets

individually, sometimes fiercely undercutting each other abroad. Institutional assistance has been sporadic in the form of trade centres and representations staffed by government personnel without the required background. These problems have long been recognised but solutions have been slow in coming.

In 1987, Cyprus joined the EC (European Community) customs union. This entails dismantling the present protection system. Although the dismantling will be carried out gradually at a rate of 9 per cent per annum, it will still adversely affect some high-cost producers who have existed solely under the high wall of protection (Cyprus Government 1990). Furthermore, in 1990 Cyprus applied for full membership in the EC (then), and in 1994 in the Corfu summit the EU (European Union) leaders took the unanimous political decision that Cyprus will join the EU in the following enlargement. An effective strategy for the industry has thus become one of the most urgent issues faced by the Cypriot economy.

5.2. THE UNDP/UNIDO FS PROPOSED STRATEGY

In 1987 the government of Cyprus used the services of the United Nations agency UNDP/UNIDO[2] to develop a long-term industrial strategy. In the light of the Cyprus socio-economic and cultural conditions coupled with the international economic and technological trends, the team concluded that there were inherent difficulties in pursuing a mass production strategy; instead flexible specialisation was suggested.

The UNDP/UNIDO[3] report is mainly divided into two phases. The first one provides

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[1]. Referred to the non-occupied area.

[2] United Nations Development Programme / United Nations Industrial Development Organisation. The project was carried out by the Institute of Development Studies, University of Sussex. The team consisted of the following members: Robin Murray (IDS team leader), Michael Best (University of Massachusetts), David Evans (IDS), Jane Humphries (University of Cambridge), Raphie Kaplinsky (IDS), James Rafferty (SME Services and University of Buckingham), Peter Snell (London Food Commission), Jonathan Zeitlin (Birkbeck College, University of London).

[3]For an article which summarises the UNDP/UNIDO report see: Murray R (1992), "Flexible specialisation in small island economies: The case of Cyprus", in the Industrial districts and local economic regeneration, edited by Pyke F and

a justified analysis of the evolution and features of the Cypriot manufacturing industry, while the second phase of the report suggests a number of steps to be taken in order to pursue an FS strategy.

5.2.1. A LABOUR INTENSIVE MASS PRODUCTION INDUSTRY

The team conducted a general examination of the industry, ranging from the economic and historic background through national and sectoral policy to firms and production units. With more than 110 plants visited in connection with several discussions held with sectoral organisations, the overall picture emerged was that of an industry geared towards mass production where labour intensiveness was a major characteristic.

The reasons cited to justify their argument were the following [4]:

- labour intensiveness. The labour force is largely semi-skilled, working on fragmented tasks. In the small scale jobbing industries labour is more skilled but unsophisticated. The skills they possess, for example, are those of a carpenter rather than a cabinet maker. Another group of labour, is those with accredited skills, often found working outside their trades;

- the rapid growth of internal and external demand after 1974 coupled with the plentiful labour available at that time in Cyprus meant that there had been a premium on output rather than quality;

- many of the entrepreneurs who previously began business as artisans - butchers, tailors, carpenters, and shoemakers - were encouraged by the demand boom and capital incentives to buy equipment from abroad, to copy foreign designs and recipes, and then to concentrate on volume;

Sengenberger W, International Institute for Labour Studies, Geneva.

[4]These problems were confirmed at the beginning of this research (1992) through personal visits to a small number of organisations and discussions held with persons possessing relevant positions. The names of organisations and persons seen are listed in appendix I.

- investments in the 1980s in dedicated machines, when labour had been tightened, led to an under-utilisation of production lines. The problem of under-utilisation was more serious in sectors like furniture and footwear which had been organised to produce a range of products;

- managerial problems were another aspect registered by the team. Among others they found a lack of financial systems and accurate price estimation techniques, inadequate material purchase control, absence of systematic training provision,

- insufficient quality control, sub-optimum plant lay out and production planning etc.

Other general features of the Cypriot manufacturing industry which compounded the above problems were: lack of specialisation as it was identified by the UNDP/UNIDO team where firms of 10-15 employees might have sales lists of 50 or more products; absence of skilful labour able to use advanced technology; and absence of relevant information particularly with regards to markets, technological developments, and environment.

The overall impression was not very promising. Even in large markets, mass production has always been vulnerable to market fluctuations causing firms to carry high stocks and work-in-progress. Especially for small economies, like Cyprus, the problems of economies of scale are enhanced. Furthermore, sectors where there are volume of economies need strong protection for the home market. In contrast, the government's policy is towards dismantling the present protection following the agreement with the EC.

Low wage labour or large firms with high working capital are two fundamental static factors for mass production in which Cyprus lacks. Bearing in mind these two limitations, there was little hope for Cyprus in competing through mass production. Many of the characteristics that under mass production are a limitation, can be

positive factors within the context of flexible specialisation.

5.2.2. AN INFORMATION INTENSIVE SUGGESTED STRATEGY - FS

It was suggested that the strategy should be started with existing sectors looking for expansion and diversification on the basis of already established skills rather than attempting to start from scratch. In particular, the UNDP/UNIDO team summarises a number of key features of flexible specialisation with which firms have to deal, as follows:

i) adaptability of production systems to movements in market demands;

ii) customisation of products for particular segments of the market;

iii) a focus on the economy of working capital, through such means as Just-in-Time production;

iv) flattening managerial hierarchies with an emphasis on team-working;

v) labour seen as an asset, providing them with a high degree of training in order to become multi-skilled; and,

vi) integration of enterprises with customers, suppliers, as wel l as close co-operation between them.

Particular reference was made to the scope for using modern management techniques and management information systems. The UNDP/UNIDO team reported the absence of such approaches and even in the scarce cases of using management information systems, these were isolated to the food and clothing sectors and are of limited use. They argued that considerable saving could be gained from the use of IT into accounting departments, payroll functions and stock control.

Finally, the UNDP/UNIDO team concluded its mission in Cyprus with a visit to Italy, alongside representatives of all manufacturing sectors, as well as

representatives from the government and other institutions. The aim of the visit was to get a flavour of the Italian FS model, in particular the existence of the consortia operated there successfully for almost two decades.

5.2.2.1. MICRO-LEVEL RESTRUCTURING

With regards to the micro-level, the UNDP/UNIDO study suggested that firms themselves have to recognise the nature of the alternative strategies and see the potential of the flexibly specialised path. It was understood that policy-makers themselves could not implement flexible specialisation strategy. It should start with those immediately involved in production, both management and workforce.

The UNDP/UNIDO report gave an example of some clothing firms which had already taken such an initiative. The owner/manager of a firm had been to the United Kingdom at his own expense attending a six-week seminar about the principles of flexible specialisation. When he returned back, he introduced some principles of FS in running his business, with each employee performing multi-tasks and using different machines, whereas previously each had been performing a single repetitive job at a single machine. Batch size was cut from 400 to 120 and lot sizes was cut to 2 to 3 piece, drastically reducing buffer stocks between work-stations.

He had also initiated a joint venture with a software writer and developed a computerised integrated database containing the detailed characteristics of all orders, their cut details and delivery data. It automatically provided a bill of materials - helping to reduce raw material and final product stocks; it provided more accurate orders to raw material suppliers abroad, and up-to-date detail on which items were selling well. It also helped production scheduling, allowing control of the scheduling to pass to production staff, thus freeing senior management. Finally, the need to integrate design, production and marketing and the flexibility offered by the new form of production was considered to have led the firm to open its own chain of shops.

The result of this reorganisation had been as follows. First, work in progress and

final stocks had been drastically cut. Interest charges of C£6,000 a year were saved due to the reduced working capital amount. Space requirements fell by 28 per cent, the value of the space saved alone being equivalent to more than the total cost of restructuring. Throughput time has fallen from nine to three days, and production lead-time from six months to three. Product flexibility rose from 15 to 20 varieties and the system has the capacity to handle up to 40 different varieties without negatively affecting production efficiency. Overall, the reorganisation produced once-off net savings of 25 per cent of annual sales, and annual net savings of 7 per cent of sales.

Such results provide a challenging case of the difficulties and the benefits of restructuring. Firm-level restructuring needs to be an important component of any broader strategy.

5.2.2.2. SECTORAL RESTRUCTURING

It is also suggested that a major step in promoting flexible specialisation strategy is the restructuring at sectoral level, specifically by encouraging co-operative initiatives amongst small firms and establishments. Small firms can purposefully come together to benefit from various economies of scale, scope and collective action that can occur through increased inter-firm co-operation - whether in the sphere of finance, production, marketing, research, training, or technology diffusion. This kind of co-operative networking can also be promoted by intervening institutions or agents.

To that end, the UNDP/UNIDO team suggested a number of institutional gaps in the industry which need to be filled:

- associations of industrialists to carry out collective services for themselves;
- an adequately funded financial institution to undertake sectoral restructuring, a long-term strategic investment;
- a orientated incentive scheme, with a number of targeted support funds;

- a centre to encourage the development of industrial design;

- a network of sectoral technology centres.

The prime responsibility to pursue such re-orientations lies with firms themselves. It is up to them to consider the relevance of flexible specialisation as applied to their current potential business and to decide whether it would be required to orientate their firms accordingly. Therefore, the question is one of strategic change from within.

Small firms in Cyprus are run by the owner-managers who are involved in all the functions of their firms. This implies inability for formal strategic planning and implementation. Whereas, information is involved, and its gathering and processing is subject to substantial economies of scale, small firms lack the resources of financing them. For example, a number of textiles firms would have liked to buy CAD systems, but their turnover did not justify it. The same is true for some machines in the furniture industry, as it is reported by UNDP/UNIDO team.

Another area of sectoral action is the improvement of the quality of input supplies. In some sectors the problem was the price and quality of inputs from existing local facilities. For instance, in the footwear sector inputs were supplied from a single local source and were found to be of lower quality and more expensive than imports. In both the furniture and food sectors there was a tension between the manufacturers and the suppliers, each blaming the other of low quality and poor production techniques.

The examples of difficulties found by the UNDP/UNIDO researchers hinder sectoral strategy. It was estimated that some can be overcome if they are taken forward by groups of firms. In Murray (1992) the case of 12 Limassol furniture makers is given, which created a consortium, the AtoZ, and each firm was designated to specialise in a particular area, e.g. children's furniture, kitchen furniture, bedroom suites, and so on. The consortium now has shops in each major town in Cyprus. From being a

group of small manufacturers competing for their local market, they have become - if all their employment is added together - the second largest manufacturing concern in Cyprus, with a growing export record. This case is among the case studies conducted in Cyprus.

5.2.2.3. INTER-SECTORAL AND NATIONAL POLICIES

Inter-sectoral and national action is needed in the area of finance, design, education, training, the whole area of labour policy, and industrial estates in order to direct firms towards the channels of FS.

Finance

In 1980 a bank for developing and restructuring was set-up, the Cyprus Development Bank (CDB). Flexible specialisation needs an industrial banking system capable of taking a long-term developmental view. With commercial banks taking a short-term stand and lack of relevant specialist expertise, industrialists were forced to use substantial short-term funds to cover long term investments.

The UNDP/UNIDO team argued that the bank had a central role to play in promoting industrial restructuring, and that this should be seen as the main function of the bank beyond its role as a project defined institution. It suggested that the function should be greatly expanded, primarily as a front-line agency to give hands-on advice and support to firms and sectors re-orienting themselves along flexible specialisation lines.

Design

Design is considered one of the pivots of the new competition. The majority of firms in Cyprus had little, if any, design capacity. Most of them, with the exception of few, who were buying designs from freelance consultants, were imitating foreign design. Given the long lead time in developing fashions in the European markets the Cypriot practice of copying existing foreign fashion, meant that Cypriot goods tended to be 6 to 12 months out of date. This weakened their competitiveness at home and overseas markets, particularly bearing in mind the keen sense of design by

Cypriot consumers.

The UNDP/UNIDO team, after extensive discussions with all industrialists and educationalist, suggested the establishment of a link between a Cyprus College of Art and Design and a Museum of Contemporary Art and Design through the Ministry of education. The aim of such an initiative would be to strengthen the educational and cultural infrastructure in the design. It was also suggested that more emphasis ought to be given to art and design teaching in secondary schools, as well as priority to students intending to go to design schools for study abroad.

Labour and Education

Flexible specialisation needs a high percentage of sophisticated, semi and skilled labour. In that respect, Cyprus was found to lack seriously. The team reports a process of de-skilling, with skilled and semi skilled workers leaving the industry and being replaced by newcomers with very low levels of skills.

Cyprus already has an industrial training authority (ITA), funded by a levy on employers. ITA has produced some of the best sector studies that exit in the country, and has been working on skill programmes with employers and unions. Some of these reflected the division of labour and responsibilities characteristic of mass production, but the ITA was among the first to embrace the implications of a flexible specialisation strategy for its training programmes.

The ITA studies suggested that the problem was less the supply of trained labour than the way labour was employed. Thus, any new policy that treated labour as a key asset in the production process required not only a reorientation of training, but also a transformation of the conditions of employment as well as the whole field of training and education.

Industrial Estates

The team found that the government of Cyprus had run a successful programme of industrial estates. However, this had not been operated in such a way as to

encourage sectoral concentration and industrial districts. Therefore, it was suggested to encourage both local and government authorities to promote plans for sectoral districts which would provide common facilities and services.

5.3. SOCIO-ECONOMIC AND CULTURAL CONDITIONS

The structure of the industry must be understood in the context of the country's position as a small island economy. Thus, economies of scale are less significant, as the firms predominantly serve the home market, which is protected from international competition by long distance, and the great bulk of its industry is geared to the consumer market (i.e. consumption goods rather than intermediate or capital goods). In 1984, 75 per cent of value added was in consumers' goods production (Industrial Statistics 1984).

The Cypriot manufacturing industry is made up of predominantly small firms. During the 1980's, small firms (under 20 workers) had increased their share of output from 27 to 34 per cent, the value added from 32 to 36 per cent, and the employment from 40.5 to 43.6 per cent. The output of firms with more than 100 workers had fallen from 41 to 34 per cent, the value added from 41 to 34 per cent, while there was an increase in the employment from 4 to 22 per cent. In 1985, out of 6,616 manufacturing firms 6,184 had less than 20 employees, 376 had from 20 to 99 and only 56 more than 100 (Industrial Statistics 1986).

The manufacturing industry has been build up on craft tradition. Its owner proprietors learnt their skills as artisan tradesmen, as butchers or carpenters, shoemakers or tailors, blacksmiths or mechanics. Many have remained so; others within a decade have built up their business and found themselves in charge of sizeable factories. In some industries, for example in shoes and clothing, the incentives to produce were so strong that some people started firms with little previous experience of that trade or in some cases of business itself.

The great majority of business firms are family owned, and the family pattern holds

for the economy in general. The Government's Statistical Department (Industrial Statistics 1984) estimated imputed wages, salaries and other benefits of working proprietors and unpaid family members at one third of actual payments to labour, excluding profits. For manufacturing in the same year, the proportion of working proprietors and partners and their share of wages and salaries accounted for 12 and 13 per cent respectively. Some owners had, as an important aim, the ability to pass on a going concern to their sons.

The government had encouraged capital investment as a route to productivity growth through very attractive incentives. Investments had been made in specialised (dedicated) machines, which favour large batch or mass production. For Cyprus' type of industries, there was limited scope for full use of such machinery, which were organised to produce a range of products for the domestic market. In these cases the problem was the inflexibility of the machinery in the face of fluctuating markets.

Another feature of the industry is the strong presence and influence of the trade unions. There are two main unions and each one represents the two traditional political sides, the "right" and the "left". Both unions have fought over the years side by side to secure better working and pay conditions for workers, in particular to establish the automatic wage indexation plan. In some instances, however, they had shown a high degree of flexibility, for example during the 1974 period. There may be a trade-off between, on the one hand, well-paid/ good working conditions and on the other innovation/ restructuring within the enterprises.

In spite of the predominance of labour intensive industry, government policy had attempted to increase capital investment as a path to productivity growth. There had been substantial incentives for capital investment in the Cypriot industry until 1987. They had included: investment and depreciation allowances; profit tax reduction from 42.5 per cent to 25 per cent on profits set aside for investment in new machinery; duty free imports of capital goods; and duty free imports of computerised systems. A high-standard telecommunication infrastructure enhanced

the acquisition and introduction process of IT in organisations.

One of the major policies put forward by the government since it's establishment in 1960, was that of a high standard/ equal opportunity education system. Coupled with the parents' devotion to offer their children education abroad to a highest level, this has had the result that Cyprus has one of the highest percentages of educated people in the world, about 17% of the total population. Many of them are coming back bringing the newest and latest approaches to the Cypriot industry.

Strong family and local ties are among the major characteristics of Cypriot society. People own their own houses and cars to a higher degree than any other Western country. Living conditions are considered very good and generally people have a considerably high income at their disposition (after tax and rent) for socialising, to spend on their children's education and/or provide them a house. This kind of environment creates a stronger feeling of responsibility of parents to their families who subsequently bring this responsibility to the work place.

Industrialists tend to know each other, as well as local and national politicians. Coupled with the strong civic and national cohesion, terms such as "obligations" and "helping relatives or friends" are certain kinds of recognisable behaviour. By employing and setting up business relationships with people that he already knows, an industrialist plays a defensive, often opportunistic strategy.

5.4. MACRO-ECONOMIC POLICY AND FS IN CYPRUS

The Cypriot government has resisted any suggestion that manufacturing should be allowed to run down, not least because of the dangers of over-dependence on what is seen as a potentially vulnerable, and volatile international service economy. Furthermore, any substantial decline in manufacturing would have a significant impact on the performance of the national economy and welfare, particularly on employment where manufacturing accounts for 20 per cent of jobs in the formal economy.

After the economic catastrophe in 1974, the government took the role of "protector", "provider", and "inhibitor" in order to help the industry be re-activated. Following a decade of transition, pressure for changes in the government's protectionist policy come from both the domestic, as much as the international environment, following the EC-Cyprus and GATT Uruguay agreements leading to a more liberal environment and enhancing trade opportunities world wide. Thus, the government, which in essence has been forced through the above agreements, has shifted its policy towards liberalisation of the domestic market and its role to act as the "challenger", "enabler", and "catalyst" of the industry (CDB 1992).

Within the above context, three main government institutions have been involved in promoting the FS strategy suggested by the UNDP/UNIDO mission, namely: the Planning Bureau; the Cyprus Development Bank (CDB); and the Industrial Training Authority (ITA).

5.4.1. THE PLANNING BUREAU

The Planning Bureau is the department where the government's socio-economic policy is articulated. The officers of the Planning Bureau are in constant contact with Ministries, Quasi-Governmental Authorities, as well as private sector organisations. In the Five-Year Development Plans of 1989-1993 and 1993-1998 (Planning Bureau 1988; Planning Bureau 1992), the Planning Bureau articulated the government's policy towards encouraging the private initiative to move in the direction of FS. The programme encompassed a wide range of measures which were based on four basic axes:

- Reforming the system of incentives on a twofold basis:
    i. Encouragement to create partnerships - consortia and putting more emphasis on the acquisition of services and equipment which will improve the internal organisation and management of manufacturing units;

    ii. Encouragement of private initiatives to set-up resource centres on a

sectoral basis for the provision of collective services such as information on fashion, marketing, design, technology, market research, training programmes, and joint sales organisation on sectoral base whose aim will be the systematic collection of information on the prospects of Cyprus products in foreign markets and informing exporters accordingly.

- Upgrading/expansion of the role of the Cyprus Development Bank (CDB) in order to be in a position to adequately respond to the needs of the industry for restructuring. An essential prerequisite towards this direction is the strengthening of the financial potential, utilisation of the funds of EC-Cyprus Financial Protocol, of the bank which will be allocated to firms on a selective basis within the framework of a desirable industrial policy.

- Adaptation of training programmes provided by the Industrial Training Authority (ITA) giving emphasis to programmes for multi-skilled jobs in order to satisfy the demand of the new policy of FS.

- The establishment of an Industrial and Technological Development Council where both the public and private sectors would be represented, with the main objective to promote industrial restructuring, technological upgrading, improvement of the mechanisms for transfer of technology, and development of a technological culture.

5.4.2. THE CYPRUS DEVELOPMENT BANK

The Cyprus Development Bank (CDB) is a corporate company, which took its present form in 1974 after becoming insolvent, with the government owning 94% and the European Investment Bank 6% of the shares issued. There is an in-house core staff of 60 people of whom 30 are professionals. Most possess postgraduate degrees while the rest are clerical and support staff. Furthermore, the CDB maintains a network of associate expertise of different specialisation, both locally and

internationally, who are hired where and when are needed.

Of particular concern to the CDB is the prevention of the core staff becoming obsolete. Thus, the occasional interaction of the core staff with the associates is used, apart from carrying out studies and assignments, and as a mean to keep the core staff abreast with current trends. A further action taken by the CDB was to set-up and currently finances a business school in Cyprus, where an MBA course is run. Finally, a dedicated training period is allocated to each employee who uses it to attend conferences and courses. Some other employees are associated researchers and lecturers with international universities.

The CDB's mission is "... to accelerate the pace of economic and social development, leading to prosperity, through the independent mobilisation and efficient allocation of scarce human and capital resources to the corporate, institutional and government market segments..." as it is quoted in the CDB: PROFILE. The mission is performed in a manner which ensures that the CDB is financially independent, earns a satisfactory rate of return on its investments and for its stakeholder, and achieves growth in market share (CDB 1992).

Bearing in mind the macro-economic context and socio-economic developments which both led to a liberal market, the CDB operates on "market terms" and not on "apparent wants", offers services to the industry on "real terms" and not on "soft terms", and practices as an "innovator" and not a "follower". It is believed that through this approach industrialists will abandon the notion of high expectations from the macro-level and pursue their own strategies in order to be able to compete in a liberal local and international market.

The CDB played the role of the catalyst in developing consortia in Cyprus, through their consulting division. The initiative was taken by the entrepreneurs themselves and the CDB added value by helping them to rationalise and develop strategies, business plans, and particularly to break the fear barrier of co-operation, since some people had some bad experiences of co-operation by being exploited, being let down

by suppliers, and so on. The CDB maintains relationships with the consortia on the basis of further consulting assignments should they asked, as well as by monitoring problems and progress of the consortia, informally.

The strategic importance of developing ISs in the consortia is acknowledged by the CDB. However, it was a matter that remained unattached in the development stage of the consortia because the smaller firms of 6-10 employees in the furniture, clothing, and footwear industry are unappreciative of the value of IT since they lack the wisdom. Concisely, these firms do not have the competence to cope with such a sophisticated approach, at least at the moment.

5.4.3. THE INDUSTRIAL TRAINING AUTHORITY

The industrial training authority (ITA), which was established in 1974 and commenced operation in 1979, is a quasi-government organisation and is the national agency for manpower training and development. It is financed by the training levy collected from all enterprises in the private sector. The ITA is governed by an executive committee formed from representatives from the Ministry of Commerce and Industry, the Ministry of Education, the Ministry of Labour and Social Insurance, the Planning Bureau, representatives of Cyprus Employers & Industrialists Federation, and representatives of the trade unions.

ITA's mission is "... to create the necessary prerequisites for the planned and systematic provision of training to the island's manpower, at all levels and in all sectors, for meeting the needs of the economy within the overall national socio-economic development policies..." as it is quoted in the ITA (1992). Thus, the ITA designs its programmes on human resources development based on the needs of the economy and the socio-economic policies.

With most SME's lacking well trained management staff coupled with the high percentage of unemployed young graduates observed in 1984, the ITA set-up a novel programme with a double objective; on one hand to alleviate unemployment of young graduates and on the other to help SMEs introduce and develop, based on

their needs, quality management staff. The programme is based on a twelve-month period where a young graduate is introduced to a firm for in-house training and his salary is partly subsidised up to 66%. After the twelve-month period, a decision needs to be made by both the firm and the trained graduate whether to join the permanent staff of the firm or not. Statistics show that 60% of the people who pursued this path of employment are still working with the same firm.

With regards to the FS strategy the ITA currently runs a programme for developing the necessary human resources required for design and implementation of IS (the programme does not include IS packages) which complements the programmes run by the IOT for technological upgrading in the manufacturing industry.

5.5. CRITICAL REVIEW OF FS AND INFORMATISATION IN CYPRUS

The study of the UNDP/UNIDO team identified a number of weaknesses and obstacles which constrain the manufacturing industry from competing in the new market environment, which tends to be more liberal. However, they suggested that the small firms, mostly family owned, could become more competitive by adopting an FS strategy. In the UNDP/UNIDO report, a number of steps to be taken and mechanisms to be established were suggested at both the macro and sectoral level in order to promote the FS strategy. With regards to the micro level, the report cites a few cases of organisations which introduced IT for both production and management purposes, and which achieved considerable improvements in terms of competitiveness.

In turn, the government which has shifted its role from being the "protector", "provider", and "inhibitor" to be the "challenger", "enabler", and "catalyst" of the industry promoted a number of infrastructural and promotional programmes towards informatisation (see Five Years Development Plans 1993-1998) which is viewed of strategic importance, not least for the FS strategy. In parallel to informatisation, a number of incentives and programmes to encourage the private initiative towards FS have been designed, such as: provision of collective services; financial incentives;

training centres; industrial estates; and IT transfer mechanisms which are all consistent with the FS strategy.

Three institutions are involved in this parallel attempt of informatisation and FS, the Planning Bureau, the CDB, and the ITA, which inter-communicate by a cross representation at the executive committee level with the aim of better synchronisation of actions taken. In the designed promotional programmes by the institutions, the introduction IT is viewed with strategic importance for both management and production and its implications to the organisations structure and human resources development.

The significance of IT to organisations is clearly appreciated among government institutions. However, the prevailing attitude is that of encouragement and not in any way of forming or suggesting strategies for the organisations. Strategy is up to the business organisations. However, the business firms in Cyprus have been born and developed in a protectionist environment with the objective to produce and not to compete, thus their business behaviour has been more opportunistic rather than strategic.

In the pursuit of reform two major questions are raised as far as organisations are concerned: Will the owner/managers (who for the most part of their lives were artisans) of the SMEs have the vision and ability to transform their business behaviour from opportunistic to strategic? If yes, at least in some cases, will they be able to understand and appreciate all these sophisticated aspects behind informatisation and FS?

What is clear at this point is that Cyprus' economy had reached a level at the beginning of the 1990s where low-wage labour no longer gives any competitive advantage. Coincidentally, the protectionist policy followed by the government during the developing stages of the economy has been abandoned. It is also clear that the socio-cultural conditions like craft tradition, a high percentage of educated people, strong presence and influence of trade unions, SMEs (including family

owned), strong family and local ties, are all factors compatible to FS strategy.

5.6. ECONOMIC AND BUSINESS DEVELOPMENTS IN CYPRUS SINCE THE LAUNCHING OF THE FS

After more than a decade from the launching of the FS strategy a number of significant economic developments have taken place in Cyprus.

With regards to implementation of the Customs Union (see section 5.1.), the first phase of the agreement has now been completed on 1st January 1997 with the general reduction in tariffs of products reaching 90%. This has negatively affected the local high-cost producers who had existed solely under the high wall of protection (Planning Bureau 1996).

At this stage the government introduced a programme of subsidising 3% on exports. In this way the government believes that firms will be motivated to become export orientated.

During the period of 1990-1998 the Cypriot economy has been growing with an average rate of 4%. The service sector has contributed most to the Cypriot economy over this period. The manufacturing sector has grown on average 1.5%, well below the average rate (Planning Bureau 1997).

The sectors of Clothing, Furniture, and Metal-Working, which have been involved in the 'experiment' of flexible specialisation strategy have shown little growth. The general view dominating among the policy-makers and other relevant institutions is that "... these sectors have not managed to use IT successfully and to an extent which would increase their productivity" (Planning Bureau 1997).

The Cypriot Government's vision on the economy of Cyprus has changed since the inception of the FS initiative, shifting the attention of development to the service sector (repeated declaration of the Minister of Finance and other officials in the

1990 -1998 period). Recently, the Minister of Finance launched a strategic plan for the creation of an Information Society in Cyprus without, however, stating any particular comment on the SMEs or the manufacturing sector. It is envisaged that the new economic strategy will enhance the IT infrastructure and create specialists and appreciation of the potentials of IT. Thus, indirectly, such strategy may help the manufacturing sector too. However, the shifting of emphasis away from manufacturing has meant weakening support from the political centres which initially mobilised enthusiasm for the creation of FS consortia and intermediary institutions.

A further development which is expected to help the SMEs in Cyprus in the direction of co-operation and acquisition of IT, is the prospective membership of Cyprus to the European Union, as membership negotiations have been underway since the 30 March of 1998, following Cyprus application for full membership in 1990 (see section 5.1). This would make the Cypriot SMEs eligible to participate and benefit actively from the relevant programmes run in the European Union, which are particularly concerned with promote co-operation and spread IT among SMEs.

The Cypriot entrepreneurs maintain the Cypriot tradition of opportunistic behaviour in doing business, which has been observed throughout Cypriot history. The comment of an entrepreneur during the process of the interviews is very characteristic.

> "... personally, I invest the money I earn from this production unit to other business activities, like tourism, which have shown more potential. I do not care if this unit closes down eventually".

A final further factor that may be relevant in the case of Cyprus is the widespread underground economy. Being predominantly family business economy, businesses tend to report as little profits as possible, while both directly related and unrelated costs are charged to the business. This has been enforced by a recent publication of

the Department of Statistics (1998) which revealed that only 13% of direct tax are paid by firms while the remaining 87% is paid by employees.

PART III

EMPIRICAL RESEARCH

CHAPTER 6

Case Study Findings in Cyprus

This chapter describes the findings of the case study carried out in Cyprus. The interviews paid particular attention to the effects of IT on organisational change and the relation of information systems and business planning in the framework of Cyprus' socio-economic and cultural conditions, as these are set-out in Chapter 5.

In terms of time, the development of FS in Cyprus was studied for a period of three years, form 1993 to 1996. Initial contact with the organisations involved was made in 1992. The case-study was conducted in two steps: it started with a pilot study, in order to make effective data collection plans, and was subsequently followed by a longer and in-depth study of all the FS organisations.

This chapter is organised as follows. The first section presents profiles of the organisations studied, classifying them into three categories: the consortia; the intermediary institutions; and, the SMEs. The case material of the organisations

studied is presented in the following three sections, each section corresponding to one category. Using the concept of industrial network, as defined in chapter two, section five describes the organisational structure and information systems development within the industrial network in Cyprus. The chapter concludes with a summary of the main findings.

6.1. ORGANISATIONS PROFILES

This section presents the profiles of the organisations studied in each category. Information was obtained during interviews as well as from other secondary sources, such as industry associations and previous studies conducted in the manufacturing industry in Cyprus.

6.1.1. PROFILES OF THE CONSORTIA

Out of the four consortia studied, three, the " AtoZ", the "Line-11", and the "MFC" operate in the furniture sector, and the fourth, the " Alox" in the metal-working sector.

The Alox consortium was set-up a decade before the existence of the UNDP/UNIDO report, in 1977. The initiative was taken by nine SMEs specialising in the production of Aluminium. They realised intuitively that it would be beneficial for each of them to co-operate and centralise a particular production process, the process of anodising the aluminium. Thus, for this purpose they established the Alox consortium.

The AtoZ and Line-11 were formed based on the principles of flexible specialisation as these are set out in the UNDP/UNIDO report discussed in chapter five. The initiative was taken by the SMEs: in the case of the "AtoZ" twelve SMEs from the district of Limassol; and, in the case of the Line-11 eleven SMEs from the district of Larnaca. The aim was to rationalise marketing and sales collectively. Both consortia approached the Cyprus Development Bank (CDB) to help them to that end as well

as to finance the projects. At that stage representatives of the CDB and the SMEs involved visited counterpart consortia in the region of Emilia-Romagna in Italy.

The MFC consortium was set-up solely to rationalise a production process, the process of panels-cutting. It started its operation at the very beginning of 1995. The initiative to set-up this consortium was taken by an SME, the PKS, which was a member of the AtoZ consortium with three other SMEs of the same size and the Cyprus Development Bank as the fifth shareholder. Cyprus Development Bank's role in this case was slightly different from its involvement in the cases of the AtoZ and Line-11 consortia. It was restrained to only to finance the investments made on computer controlled production machinery.

A profile of the consortia studied is provided in the table below.

CONSORTIA	**AtoZ**	**Line-11**	**MFC**	**ALOX**
Established	1987	1991	1994/95	1977
Sector	furniture	furniture	furniture	metal
SME members	12	11	4	9
Headquarters	Limassol	Larnaca	Limassol	Nicosia
Domain of activities	Marketing & Sales	Marketing & Sales	Production	Production
Influential to emerge	UNDP	UNDP	Experience acquired	Intuitively

TABLE 6.1. Profile of the Consortia Interviewed.

6.1.2. PROFILES OF THE INTERMEDIARY INSTITUTIONS

Two intermediary institutions have been established so far in the attempt to develop flexible specialisation in Cyprus. These are the Institute of Technology (IOT) and the Institute of Fashion (IOF). The IOT provides horizontal services to the industry, that is services designated for the whole industry. The IOF provides vertical services that are services designated for a particular sector, the clothing and textile sector. Both institutions have received a start-up subsidy from the government.

The suggestion for the establishment of these institutions was among others made by the UNDP/UNIDO team (UNDP/UNIDO 1987). The initiative of establishing the IOF was taken at the sectoral level by the clothing association in 1994, following several visits to counterpart institutions in Italy and France.

The establishment of the IOT was among the government's priorities set-out in the Five Year Development Plan (1989-1993), and was established in 1992. Both institutions are registered as non-profit organisations. The table below provides the profiles of the institutions studied.

INSTITUTIONS	**IOT**	**IOF**
Established	1992	1994
Type of services	Horizontal	Vertical
Initiative taken at	Governmental	Sectoral
Extent of IT use	High	High

TABLE 6.2. Profile of the Intermediary Institutions Interviewed.

6.1.3. PROFILES OF THE SMES

Twenty SME members of the four consortia have been studied. All SMEs are 'typical' family-owned business, with the owner being the manager involved in all aspects of the day-to-day running of the companies. These are small firms with a range of 10-15 employees and even smaller 'workshops' operated by 3-4 people using their craft skills.

In the AtoZ consortium, there were two types of SME members in terms of numbers of employees. Those employing about 15-20 persons, which used to be 'workshops' operated by 3-4 persons using their craft skills, and those employing about 30-40 persons, which used to be SMEs employed 15-20 persons, at the time of the consortium establishment.

SME members of AtoZ	**SME members of Line-11**	**SME members of MFC**	**SME members of Alox**
PKS	K. Georghiades	PKS	Slim
VEXAM	E & A Christ	2000	Alousak
S. Leonida	Titan	Ferco	Elko
A & M	Symmetrico	Enoxyl	Kerpa
Armevtis	Pakaris		saloumko
Viokale			

TABLE 6.3. Names of the SME Members of the Consortia Interviewed.

In the Line-11 consortium, there is only one type of SME members. They used to employ about 15-20 persons at the time the consortium was set-up, while currently they employ about 20-30 persons. Likewise is the case with the SME members of the MFC consortium. Of course in this case one of the major selection criteria was

to be of similar size. They employ 40-50 persons. Finally, in the case of the Alox consortium, SME members size varies from 10 to 30 persons.

6.2. THE CONSORTIA ORGANISATION AND USE OF IT/IS

This section describes the organisational structure and the extent of IT use in the consortia and addresses the implementation process of IS in terms of scope. Each consortium case is presented separately.

6.2.1. THE "AtoZ"

The idea of establishing the AtoZ consortium in 1987 was translated into a goal: to register an autonomous legal entity (the consortium) with the SME members of the consortium being equal shareholders, with the aim to promote common marketing under the trademark of the consortium.

The consortium started its operation as an independent legal and financial entity by creating showroom in all major cities in Cyprus. Its headquarters are based at the same industrial zone with the SME members, in the district of Limassol.

The consortium is governed by an executive committee of five shareholders, elected from the twelve members of the shareholder committee, plus the executive director of the consortium. The executive director has the responsibility of formulating the strategy to be followed by the consortium, and generally taking all the important decisions. In turn, the executive committee reports to the shareholders committee on an annual appraisal basis. The executive committee is accessible by any shareholder should they decide to bring up for discussion any ideas or suggestions, but usually it is the executive director who makes the suggestions.

The executive director has the obligation and responsibility of implementing the strategy defined and decisions taken by the executive committee, informing the shareholders accordingly, as well as ensuring the day-to-day administration of the

consortium. Further to the executive director, the consortium employs a design manager, a marketing and sales manager, and five of clerical and support staff.

Organisationally, following the establishment of the agreement between the SME members, a manual and very informal information system was used to transfer information from the showrooms to the SMEs production lines. That is, when a customer placed an order, a standard form was filled and the details subsequently were passed to the consortium headquarters. The consortium then passed the details of the order to the specialised SME. Mainly this process was done by telephone. That created a number of problems such as incomplete information and misunderstandings, which in turn were causing delays on the pre-specified delivery dates.

Such serious problems were brought to attention of the executive committee of the consortium which decided to computerise the order taking. Technically, the new computer-based information system was relatively simple. A database was established at the headquarters of the consortium. Once an order was received the details were passed to the headquarters and the data was entered onto the database, from where they were automatically distributed to the specialised SME.

The computer-based information system incorporated a penalty system for late deliveries. The penalty system was expressed in terms of money through reallocation of an order.

It is accepted by all parties interviewed that the system has made an impact on a number of other organisational aspects. The consortium is now able to produce information lists on orders, dates, customers, as well as on selling prices. Particularly, regarding the last one, the new system has simplified a very complicated and time consuming process, bearing in mind that the consortium keeps changing its selling prices very frequently throughout the year.

Later, the executive director proposes a number of steps to be taken, based on the accumulated experience. Firstly, to install in each showroom a terminal which would be connected with the database at the headquarters, to process information of orders. Secondly, to add a design system through which SME members would be able to propose models and then display them at the outlets of the consortium and monitor customers' response. Furthermore, it was suggested that the system would enable the consortium to respond to the growing number of customers who were ordering one-of-a-kind. However, none of these suggestions was implemented.

Currently, the consortium operates outside the initial goals set. At the very beginning of its operation (1987-1992), both the consortium and its SME members sustained growth. This was attributed to two factors: an easily accessible Eastern European market due to the lower-wage labour advantage in Cyprus vis-à-vis main competitors, Italians and Greeks; and a coincidental growth of the local market due to the boom of the construction industry.

Subsequently, when these two exogenous factors ceased to exist, competition became fierce in the local market, while the Easter European market remained inaccessible for the Cypriot manufacturers. At that point SME members' behaviour towards the consortium started becoming 'peculiar', causing the consortium survival problems (both operational and financial).

Eventually, the AtoZ consortium ended up operating as a trader, importing furniture and selling them through its showrooms. The SME members still remained its shareholders.

6.2.2. THE "LINE-11"

The idea of establishing the Line-11 consortium in 1991 was translated into a goal, the same as in the case of the AtoZ consortium: to register an autonomous legal entity (the consortium) with the SME members of the consortium being equal

shareholders, and with the aim of promoting common marketing under the trademark of the consortium.

On the one hand, Line-11 started its operation as an independent legal and financial entity, as in the case of the AtoZ consortium. On the other, Line-11 was creating showrooms in all major cities incrementally, that is firstly in one major city following in another and so on, in contrast to the case of AtoZ. The Line-11's headquarters are based on the same industrial zone with the SME members, in the district of Larnaca.

The Line-11 consortium was governed, as in the case of the AtoZ, by an executive director who had the obligation and responsibility of ensuring the day-to-day administration of the consortium. Furthermore, the consortium employed a number of clerical and support staff, including showrooms sale staff. In contrast to the case of the "AtoZ", the executive director had been given much more authority and room to manoeuvre. It is important to notice here that the first executive director was a former "AtoZ" executive director.

A manual and very informal information system was used by the consortium to transfer information from the showrooms to the production lines. That is, when a customer placed an order, a standard form was filled with the order's details which subsequently were passed to the consortium headquarters. The consortium then passed the details of the order to the specialised firm/shareholder. This process was done by telephone and fax machines. In contrast to the case of " AtoZ" consortium no problems were reported, such as incomplete information and misunderstandings.

Between 1991-1993, the Line-11 consortium and its SME members sustained growth by concentrating in the local market. No exports were reported. In 1993, as in the case of the AtoZ consortium, the Line-11 became an importer/trader of furniture. Out of its eleven original firms/shareholders only four remained so.

6.2.3. THE "MFC"

The MFC consortium strategy was defined by the four SME shareholders and was based on the experience and perception that the PKS, a member of the AtoZ consortium, had drawn from its involvement in the AtoZ consortium. The starting point was that the SME shareholders should not exceed five, and that they should be approximately of the same size.

The role of the consortium and its strategy were determined as follows: to register a new legal entity, the "MFC" with five equal shareholders, with the aim of pursuing an efficient specialised process for production, the panelling cutting.

Utilisation of computer controlled production machinery was seen of strategic importance in the newly established consortium. The goal set was to achieve 60% utilisation, of the capacity of the computer controlled production machinery optimal capacity for the first three years. This figure covered the total panelling cutting for all four SME members.

Initial speculation to transfer computer controlled production machines and employees from the SME members to the consortium was made. However, a number of problems emerged, such as: obsolete machines with limited capacity and capability; compatibility; and organisational constrains. Ultimately, it was decided to set-up the MFC and acquire modern IT production machines. A small number of employees were transferred from the SME members to the consortium.

The consortium is run by an executive director who was employed to hold responsibility of the day-to-day administration. There is also a secretary who carries out the clerical work as well as nine people in the shop floor. Management decisions are taken by the board committee which consists of the four owners/managers of the SME members in consultation with the executive director, who then in turn has the responsibility and obligation of implementing any decisions reached.

The goal set of achieving 60% utilisation of the newly installed computer controlled production machines was nearly achieved within the first six months of the consortium operating. Bearing in mind that the whole process of panelling cutting work of the SME members has been transferred to the consortium, which covers only 60% of IT production machines' utilisation, the consortium has plans to take subcontracting orders from firms which are non-member of the consortium. The attempt is to reduce the machines' idle times by exploiting subcontracting potentials.

A manual information system is used to transfer information from the SME members to the consortium. That is, a standard form is filled with all the relevant information including designs of the products for each order. When the order arrives at the consortium all the details are loaded into an algorithm which does the optimisation with regards to the size of the panels to be used, thus achieving minimum waste of raw materials. Subsequently, and according to the production planning schedule, the output data are loaded into the IT production machines manually, which in turn carry out the tasks. Meanwhile, the relevant programs are loaded into the IT production machines memories, manually again.

The computer controlled production machines do not communicate with each other. Thus, for every process, data and the necessary software programs have to be loaded. Apart from the time needed, mistakes in data entering and program loading often causes delays. Likewise, in the case of the algorithm, which is used to manipulate data and provide information to enable the consortium having minimum waste of raw materials.

Currently, there are no plans for developing a computer-based information system to integrate the operations involved. However, a number of problems such as inadequate information, wrong information, misreading, and delays have been reported.

Most important to mention is that, organisationally, the consortium was designed in such a way as to retain and reinforce power to the owners/managers of the SME members and not in any way to demand owners/managers to cede power to the consortium level. It was also designed in such a way as to maintain and enhance the 'industrialist' image of the SME members through retaining their own strategies, management, marketing, and firms' brand which in turn allow each firm to compete and grow based on their own ability and in no way dependently on the other SME members.

6.2.4. THE "ALOX"

Up to 1977, all the aluminium traders depended on a monopoly of a single producer of aluminium architectural profile (design and colour) who was also a trader and thus a competitor. With good market prospects as a result of the boom of the construction industry at that time, a number of aluminium traders launched the idea of establishing a consortium for purely production purposes.

The idea of the consortium was translated into a goal: to register a new legal entity, the Alox with nine SMEs being equal shareholders, which would be specialised in anodising the aluminium. This is a chemical process through which the architectural shape of the aluminium is produced.

The organisational structure of the consortium is very similar as in the other consortia presented so far. It employs a production manager responsible for ensuring the day-to-day administration of the consortium and the shareholders being members of an executive committee taking decisions on strategic issues. Furthermore, the consortium employs clerical and support staff as well as shop-floor workers.

Gradually, however, the shareholders were selling their shares to each other and the consortium ended up in 1990 being owned by one of the original shareholders. The

others have been remained simple customers. The structure and specialisation of the consortium is still the same as when it was originally set up.

The consortium developed inter-organisational relationships in two directions. Firstly with its SME members, which to a great extent depended on the production lines capacity which were designed in such a way as to cover the needs of the SME members. Even, after the transformation of the ownership of the consortium these inter-organisational relationships have remained stable, as when they were originally developed. That is, the SME members remained the hub firms which implied that they retained power in their firms.

The second direction of inter-organisational relationships was developed with the suppliers of technology. The suppliers are based overseas and apart from supplying raw materials for the processing of aluminium sheets and profiles, they keep the consortium aware on technical matters, as well as on technological progress. The inter-organisational relationship between the consortium and suppliers is complemented by a yearly visit of the suppliers to the consortium.

The consortium has been progressively upgraded technologically. A modern production line, the powder coating method which is a non-chemical process having the potential of producing unlimited number of colours, compared with the mono-colour potential of the anodising chemical method, was introduced in 1989.

With regard to the use of IT, in 1992, the consortium introduced a computerised system based on a database for accounting purposes, while currently the system is extended to cover inventory control.

The information system developed in the Alox consortium is a simple one, and was developed to simplify the accounting procedures, like payroll, issuing invoices, keeping accounting records, and making accounting entries. The tangible benefits

reported from the use of this system were saving of personnel and time, and enhancing speed of dealing with the accounting matters.

At the same time, the system was interfaced with the accounting system in one of the consortium's customer (the company is owned by the same person currently) and this facilitates the transformation of all accounting transactions between the consortium and the customer to be reported through the computerised system. It has been argued that the information system empowered the relationships between this particular customer and the consortium.

A manual procedure is followed to deal with other customers. All orders are received on a hand-written form, while the invoices, credits and debits, issued passed to and come from the customers in a manual way. Currently, the information system has been expanded in order to be able to keep records on the inventory levels.

6.2.5. SUMMARY

Organisationally, the formation of consortia implies that a number of individual SMEs are allied together under the common flag of a consortium with a shared identity in order to pursue specific activities, like market penetration and production activities. In this way economies of scale are created, and thus size, which gives them clout in the market. Decisions on strategic issues are taken at the consortium level.

A distinction must be made between the two types of consortia found operating in Cyprus. The AtoZ and Line-11 consortia are concerned with marketing and sales activities, while the MFC and Alox are concerned with production activities. In fact, the MFC and Alox provide sub-contracting activities to their SMEs members. Based on Holmes' (1986) classification, the parent firms (the SMEs in this case) and the sub-contractors (the consortia) are engaged in different but complementary production activities.

Due to the nature of their activities, the MFC and the Alox established for production concern, had to consider the use of computer controlled production machinery, which was seen to be of strategic importance. Other than for rationalising the production process, none of the four consortia considered the use of IT as of strategic importance.

The AtoZ and the Line-11 consortia, after an initial period of 'successful' operation, in the sense that they were operating within their initial goals and sustaining growth, have been forced by the 'peculiar' behaviour of their SME members to operate as import traders. In contrast, the MFC and the Alox still operate within their initial goals set.

6.3. THE INTERMEDIARY INSTITUTIONS ORGANISATION AND USE OF IT/IS

This section describes the organisational structure and the extent of IT use in the intermediary institutions and addresses the implementation process of IS in terms of scope. Each intermediary institution's case is presented separately.

6.3.1. THE INSTITUTE OF TECHNOLOGY

The Institute of Technology (IOT) was established in 1992 with the aim to develop the manufacturing industry through technological upgrading and the creation of new high-technology industrial units. IOT's aim is to: promote co-operative relationships between industrial units; establish an information and technology centre; and, provide consulting services in the areas of technology and industrial development.

The IOT is governed by an executive committee. It comprises the minister and the general manager of the ministry of Commerce and Industry who are the president and the vice-president respectively. The general secretary of the Planning Bureau, six representatives of the Cyprus Employers and Industrialists Federation, the

director of the Industrial Training Authority, and a representative from the Ministry of Economy are members of the executive committee.

IOT has an executive director who is responsible for the day-to-day management and for public and international relations, as well as for preparing suggestions for strategic development. There are also administrators, as well as support and clerical staff.

At the IOT, a technology information centre has been established. This centre provides information to the manufacturing industry, consultants, and any other interested party. The information provided covers a wide range of areas, such as: market research, trading, abstracts of research work, supply and acquisition of technology, industrial European Unions' policy, environmental (research and regulations), statistics, academic and professional journals, and programmes on human resources training.

The IOT, in order to support its operation, uses IT in network form. The IOT's information system involves a number of information technologies such as databases, spreadsheets, and office technologies. Computers and communication technologies support inter-relationships with local organisations, institutions, and governmental departments, as well as with international counterpart information centres, information banks, and publishers.

Since 1996, the IOT has been appointed to act as the national administrator of a programme, which has been worked out by the Cypriot government and the World Bank. In this programme the IOT administers funds for subsidising up to 40% for consulting services regarding IT. A small number of SMEs have used this programme, but only up to the point of having a consultancy report without, however, proceeding with the implementation of the recommendations made in these reports.

6.3.2. THE INSTITUTE OF FASHION

The Institute of Fashion (IOF) is set to deliver selected and useful information for the daily activities of the textile and clothing firms. The information services provided are divided into three domains: fashion & design; technology; and research & marketing. The intention of the IOF is translated into a sub-goal for each domain:

- In terms of the domain of fashion & design: to monitor and be aware of the international trends in fashion (materials, colours, designs, etc.) and to provide the technological means for design.

- In terms of the domain of technology: to evaluate and provide information to the industrial business firms that may be interested in acquiring IT and developing IS.

- In terms of the domain of research & marketing: on the one hand to collect, evaluate, manipulate, and disseminate information for specific foreign markets to the sectoral firms, and on the other to provide information to foreign firms should they be interested in co-operating with the local firms.

The IOF is governed by an executive committee. It comprises 9 persons; five persons represent the clothing association, while the ministry of Trade and Industry, the ministry of Labour and Social Insurance, the Industrial Training Authority (ITA), and the Institute of Technology (IOT) each has one representative respectively.

Administratively, there is an executive director who is responsible for the day-to-day administration and for contacting the public and international relations, as well as for preparing suggestions for strategic development. There are also administrators, each one responsible for one of the domains of services provided by the IOF, as well as support and clerical staff.

Organisationally, the IOF is set to provide services in three directions with the following characteristics:

- Technical facilities: this include a CAD system for design, IT evaluation, and a laboratory for raw material testing;

- Awareness & Training in using CAD/CAM systems, production systems, and quality systems;

- Information & marketing on fashion trends, evolution and characteristics of the markets, as well as setting up and maintaining a library with information on fashion and technology.

As in the case of the IOT, the use of IT is extensive and it is applied to all domains of the IOF's operations. The information system involves a number of information technologies, such as a database, a CAD system, and a videotext.

In order to be able to acquire and provide on time the right information to the clothing sector, the IOF has developed inter-organisational relationships with a number of local organisations, institutions, and governmental departments, as well as with international counterpart institutions, information banks, and publishers on fashion and technology.

These inter-organisational relationships are set to go well beyond the pure exchange of information; they are set to expand on exchange of knowledge through organising conferences and seminars. Especially, from the IOF side, each administrator has the responsibility of initiating, in co-operation with other local and international institutions, organisations, and particularly counterpart institutions, such events.

6.3.3. SUMMARY

The IOT is the information centre of the industrial network in Cyprus, while the IOF is specialised to offer vertical services to the clothing and textile sector.

Organisationally, the institutes attempt to complement each-other, enhanced by cross-representation among related institutions and interests, in order to provide a range of specialised services which would not be easily acquired by the SMEs in isolation. Their principles of operation are, however, similar to their counterpart institutes visited in Italy.

Both intermediary institutions have been set to provide external information such as data on potential markets, new technologies, and on foreign competitors. So far, the two intermediary institutions have not been used by any SME or consortium, for such services.

6.4. THE ORGANISATION OF THE SMES AND THEIR USE OF IT/IS

Following the established agreement of the consortia, between the SMEs of each consortium a goal was set:

- for the cases of AtoZ and Line-11, each SME to continue to remain an independent entity but to specialise in a by-product, that is one specialising in children's furniture, a second one in garden furniture, a third one in pinewood furniture, a fourth in office furniture, and so on; and,

- for the cases of MFC and Alox, each SME to continue to remain an independent entity but to allocate the processes of panelling cutting and aluminium anodising to the consortia respectively.

Coupled with meeting the goal set for the consortia, SMEs expected to increase competitiveness through utilising computer controlled production machinery. All the SME members of the four consortia benefited through schemes which provide incentives for collective action of IT acquisition. There has been an incremental investment on computer controlled production machinery which has been enhancing productivity and production capacity considerably.

As the SMEs were getting bigger in size they have started introducing IT for administration purposes, like databases, PCs, and accounting application. A further step was taken by the owner/manager of an SME member of the MFC consortium who introduced an AUTO-CAD system and was trying to familiarise himself with the potentials of the system.

Organisationally, in all SMEs, the owners/managers have personal control and direct supervision of much, and often all, of what is going on and thus have a wide span of control, with everyone else reporting to them. An indicative example is at the production level where there is close communication between the workers and the owner/manager. There is also a loose division of labour with little differentiation, with the exception of workers specialised in running IT production machines.

The introduction of IT has changed the overall perception about the required skills. While before there was a demand for people with craft skills, now there is a demand for people who have the confidence and desire to learn how to run IT production machines. The employees' perceptions of the introduction of IT production machines has been growing positively over time as the benefits gained were becoming tangible. A worker stated "we welcome any kind of machinery and organisational change that will make our lives and work easier".

SME members of the AtoZ and Line-11 consortia argued that for the first two to three year period of the consortia operation, the SMEs were helped to increase their sales and ultimately to sustain growth. However, this momentum did not keep up. Conflicts emerged and slowed down the consortia sales, while SME members were increasing their sales through their own mechanisms of marketing. That created divergence of interests between SME members.

Going on their own into the market is imperative for the AtoZ and Line-11's SMEs since their consortia could not absorb the whole production capacity of their firms, as they argued. As a result of this, the SMEs, without any restriction and control,

started taking orders of products outside their specialisation product line in order to utilise their computer controlled production machinery on full scale capacity, if possible. In turn that caused SMEs to back-step into their pre-consortium situation, unspecialised. SMEs from fully co-operators of the consortium were being turned into their biggest competitors in the market, even by price, bearing in mind that they were selling, in some instances, the same product lines. Eventually, in some cases, SMEs arbitrarily increased the pre-specified selling prices to the consortia and that caused conflicts.

Owners/managers of the SME members of the AtoZ and Line-11 view the consortia as a customer with whom they have a special arrangement, to supply a particular line of products based on a pre-specified price mechanism and making deliveries on time or on specified dates. Behind that, they argue, "We can take any contract of work we want and produce whatever we want".

A stable situation has been observed in the cases of MFC and Alox's. The two consortia still operate and meet the goals set originally, while simultaneously sustaining growth. The SMEs engaged in the establishment of the MFC and Alox consortia seem for the moment to be 'successful', in the sense that they are still meeting the objectives originally set, and they are staying more committed to them. This has not happened in the cases of the SME members of the AtoZ and Line-11 and there has been a less clear understanding of the difficulties hindering their development.

SMEs owner/managers repeatedly complained that the government does not intervene to support them in different directions. In short, they expect the government to be their 'protector', 'provider', and 'inhibitor' towards their competitiveness and even, in some cases, sustaining their survival. This is a dominant attitude among industrialists emanating from the strong protectionism policy followed by the Cypriot government during the development stages of the economy.

6.5. THE ORGANISATIONAL STRUCTURE AND IS DEVELOPMENT IN THE FS NETWORK OF CYPRUS

Information systems were developed in parallel to the organisational development of flexible specialisation strategy in order to facilitate the accomplishment of the goals set in the industrial network.

The intermediary institutions are set to be the cross point between international markets and the local SMEs, as described above. Computers, telecommunications as well as a range of office technologies, like CAD/CAM, databases, and videotext are used in order to support interrelationships with local and international organisations and information banks.

In particular, the Institute of Technology has been established with the aim of acting as the national information centre which would provide information covering a wide range of areas. Such a case is also the Institute of Fashion, from where information received would be processed, and disseminated to the local firms, and vice versa for information concerning local firms should international firms be interested in co-operating with SMEs.

A range of technologies are embedded in the information system of the Institute of Fashion. At the core of these technologies is a database which is used multi-purposely: as a library in order to accumulate information on fashion and technology; as an information bank to store captured information before it is evaluated, manipulated and disseminated; and finally, information from the database is retrieved and projected via a videotext for illustrative purposes in seminars, training sessions, and marketing.

In order to translate the fashion ideas into designs, the IOF employs an advanced CAD system with the potential of being integrated with a CAM system in order to facilitate the flow of information to the production lines of the firms. Colour analysers and printers are linked with the CAD system in order to enable the

clothing and textile enterprises themselves to produce their own range of designs and to prepare their own marketing catalogues.

Within the content of information systems development and IT use, paramount importance is given to the running of seminars and training sessions. Training is set to be provided, particularly to the designers and users of the CAD system, who may also attend seminars in order to keep updated with current fashion trends. Training and seminars are also set to be given for topics such as production planning, quality control, human resources development, and marketing. These sessions are set to run at the inter-firm level.

In the case of the consortia, the development of information systems for management and administration was not considered to be of significant importance. Initially, information was processed manually. However, in the course of the development of the consortia a different pattern of IS development was followed.

The AtoZ and Line-11 consortia started operating with a manual information system. Subsequently, in the case of the AtoZ consortium, the system was computerised. That, as it was argued, had created a new organisational attitude in the SMEs. As all the owners/managers emphasised:

> "While before we were assuming that one or two weeks delay on delivery dates would not be considered as a major problem, now we know that such a case can not be tolerated. Therefore, we have to schedule production planning accordingly, which in turn affects planning ahead of suppliers delivery, machine set-ups, and rotation of employees".

This attitude is shared not only between owners/managers but among employees as well.

In the case of the MFC consortium, a computer-based IS has not been considered yet. Both sides, the consortium and the SME members, have reported a number of problems such as inadequate information; wrong information; misreading ; and

delays. These problems emanated from developments and transformation of the organisational structure of the organisations involved as a result of the introduction of computer controlled production machinery.

The introduction of computer controlled production machinery was not treated as an isolated event. It was viewed as central to organisational changes, at both the SME members and the consortium. In fact, a long process of standardisation of all the possible products' parts has been underway in the SMEs which it is expected will eventually lead to economies of scale, and will ultimately decrease the number of products' parts used by the SMEs. The standardisation process has been making an impact on a number of aspects: reduction of data used; reduction of information transfer; reduction of inventory; and reduction of costs.

The standardisation process pursued by the SMES made an impact at the consortium operations. It reduced the data needed to be manipulated and the information to be transferred in the consortium, which resulted in less changeovers of the production processes. Furthermore, it resulted in less hardware capacity to save data, as well as, programs for processing.

The information system in the fourth consortium examined, the Alox, is a simple one and it was developed to simplify the administrative procedures, like payrolls, issuing invoices, keeping accounting records, and making accounting entries. The tangible benefits reported from the use of this system were savings of personnel and time, and enhancing speed of dealing with the accounting matters. Currently, the consortium has expanded the system in order to be able to keep records on the inventory levels.

The four consortia examined deal with the local market and differ in terms of the type of business action they pursue, from marketing and sales to specified production process. The establishment of the AtoZ, Line-11, and MFC were also

linked to incentives offered by the government for collective programmes for acquisition of subsidised IT.

These programmes were used only up to the acquisition stage. Afterwards, each SME pursued its own strategy and decisions. However, the pattern of introduction of IT in production was found to be the same in all SMEs. IT was introduced within a very positive organisational climate, particularly from the viewpoint of users (workers), and adapted in the organisational restructuring. In all cases computer controlled production machinery stood alone, i.e. there was no transfer of information to or from each other.

The use of computer controlled production machinery was considered of paramount importance by all members of the consortia in achieving specialisation and ultimately increasing competitiveness. Increase of production capacity and productivity were the tangible benefits and were appreciated by both the owners/managers and users.

However, in the cases of SME members of the AtoZ and Line-11, utilisation of IT has not exceeded 30% of the specified optimal capacity of the machines acquired. As already mentioned SME members of the AtoZ and Line-11 went into the market on their own and took orders of products outside their specialisation product line. That led to weakening the co-operation at the consortium level and back stepped the SMEs' organisation, from specialised to unspecialised.

A stable situation has been observed for the SME members of the MFC and Alox consortia. Clearly, there is an organisational contrast between the SME members of the AtoZ and Line-11, and the SME members of the MFC and Alox consortia. In the former, customer-orders were taken by the consortia and allocated to the SME members, while for the latter, customer-orders were taken by the SME members and specific process was allocated to the consortia.

In general, particular attention in the FS network of Cyprus was paid to analysing the information that was communicated between the various organisational units involved and the means of communication. Most of the information originated from and was used for the day-to-day activities of the firms such as placing orders and technical and design data for production. The use of external information such as data on potential markets and new technologies was perceived by the SMEs and the consortia of minor, if any, importance.

While the SMEs and the consortia used computer controlled production machinery, information for current operations (orders, transportation, status inquiries, etc.) was exchanged primarily through a variety of personal interactions, telephones, faxes, and sometimes mail. External information was sporadically acquired mainly through traditional channels such as fairs and expositions. This shows that the intermediary institutions have not yet acquired significance in the FS network of Cyprus.

6.6. CONCLUSION

This chapter presented the empirical evidence of the case of Cyprus' attempt to develop flexible specialisation strategy. The various organisations involved in the industrial network in Cyprus, SMEs, consortia, and intermediary institutions, take the organisational forms of flex-firm, federal, and network respectively.

The empirical evidence showed that application of computer controlled production machinery was viewed of strategic importance in order to rationalise their production and produce more efficiently. Likewise, in the case of the MFC consortium the use of an algorithm to optimise use of wood panels based on the data entries was seen as strategic for the SME members. In the case of the AtoZ the integrative role of IT emerged as a necessity, to resolve communication problems, but it was never seen as being significant for the growth of the SMEs' or for the success of the consortium.

IT was viewed of strategic importance in the case of the intermediary institutions in order to facilitate the accomplishments of the their operational goals, e.g. a database to accumulate information on fashion and technology, and a CAD system for design. Nevertheless, developments at that level are also less than impressive.

In all cases, information system developments have influenced organisational aspects and were influenced by the organisational structures of the organisations' concerned. In the case of the AtoZ, the information system developed relationships between the consortium and the SME members, as well as the fact that customers became closer.

However, overall IS development in the industrial restructuring of SMEs in Cyprus is very poor. In none of the three organisational levels can rich information services and communication networks be found. Contrary to the literature suggestions and the FS strategy recommendations, the organisational restructuring was not accompanied by innovative IS applications for management purposes.

Most important to notice is the behaviour of the SME members of the AtoZ and Line-11 consortia. In both cases, when the consortia reached a point where significant decisions had to be taken for further integration between their SME members, implying that SMEs had to allocated some power to the consortium level, the SMEs massively exited the system.

CHAPTER 7

Case Study Findings in Emilia-Romagna (Italy)

This chapter describes the findings of the case study carried out in the region of Emilia-Romagna in Italy. A number of factors justify the selection of this case. First, it is widely quoted in the literature as a successful flexible specialisation case; second, the example of Emilia-Romagna has been invoked repeatedly in the process of preparing the UNDP/UNIDO report for Cyprus, since it was judged that the manufacturing sectors operating in Emilia-Romagna are similar as those in Cyprus; third, many Cypriot entrepreneurs and government officials visited the region of Emilia-Romagna to see and understand this case, before consortia and intermediary institutions were formed on a formal basis in Cyprus; and fourth, the particular socio-economic and cultural conditions of the region of Emilia-Romagna are considered to be very close to those of Cyprus.

This case will be used as a reference point to provide a basis for comparison for the analysis of the main case-study conducted in Cyprus. In terms of time, this case-study was one-shot, i.e. at a particular point in time, in April 1996. Information was obtained

by interviews during a month long visit, as well as from other secondary sources, such as industry associations and previous studies conducted in the region of Emilia-Romagna.

As in the case of Cyprus, the interviews paid particular attention to the effects of IT on organisational change, and the relation of information systems development and business growth. The impact of the Emilia-Romagna regional socio-economic and cultural conditions on the above two dimensions of analysis is also examined.

This chapter is organised as follows. The first section gives the general socio-economic and cultural conditions of the region of Emilia-Romagna. Section two lists the organisations studied and classifies them into four categories: Contextual, Intermediary, Consortia, and the SMEs. The case material of the organisations studied is presented in the following four sections, with each one corresponding to one of the categories. Using the concept of industrial network, as defined in chapter two, section seven describes the organisational structure and information systems development within the industrial network in Emilia-Romagna. The chapter concludes with a summary of the main findings.

7.1. THE LOCAL SOCIO-ECONOMIC PROFILE

Emilia-Romagna with 4 million inhabitants is the second richest of the 20 Italian regions and is divided into 8 provinces (ASTER 1995). The Emilia-Romagna local government, as with other Italian regions, has its own territorial self-governing administrative bodies with legislative powers regarding administrative organisation and set-up, social services, economic development, land use, and zoning. Its main town is Bologna.

Up to 1995, the employment rate was one of the highest in Europe. This is mainly due to the considerable incidence of female labour which results from the wide spread services available to families. At the same time the unemployment rate is 6.0% (108,000), and although it has kept growing in past years (in 1990 it was 4.6%), it has

always remained much below the national figure. In the region, there are four Universities, many research bodies and specialised laboratories which ensure considerable support for companies and, at the same time, provide highly qualified personnel to the job market (ERVET 1995).

Emilia-Romagna also features positive social indicators from the social viewpoint: significant examples are the high education rate, with 140,00 students enrolled at the university of Bologna; and the child mortality rate, which in Emilia-Romagna is 6.6 per thousand, against Italy's 8.1 (ASTER 1995).

Emilia-Romagna has a highly differentiated entrepreneurial structure, with many business firms scattered throughout the region amounting to 41.5% of total companies (ERVET 1995). Co-operatives play an important role. Historically, co-operative culture was first developed in the agriculture sector, at the end of the Second World War. With the aim of achieving economies of scale and thus being more competitive in exporting, farmers collaborated with land-owners on the basis of equal partnership (50% each). Thus, the higher the productivity the more was earned by both the farmers and the land-owners.

7.2. ORGANISATIONS STUDIED

The organisations interviewed in Emilia-Romagna are listed in table 7.1, classified into four categories: the contextual institutions, the intermediary institutions; the consortia; and the SMEs.

CNA and API, are the employers' associations. ERVET is the agency responsible for the economic development of the region of Emilia-Romagna.

With regards to the intermediary institutions, out of the eight studied, the CITER, the CERCAL, the QUASCO, and the CENTRO CERAMICO provide vertical services, i.e. each one is dedicated to a particular sector. Three, the DEMOCENTER, the CERMET, and the CERMA provide cross-sectoral services, i.e. each one to two or

more sectors, and one, the ASTER, provides horizontal services, i.e. to the whole industry.

Two consortia have been studied, the CON.ART.EXPORT and the Centro Unitario Forme. Finally, with regard to the SMEs the objective was to study the inter-relatedness and degree of co-operation with other organisations within the context of the industrial network in Emilia-Romagna, and to a lesser degree to picture their present structure and extent of IT/IS use.

CONTEXTUAL INSTITUTIONS	**INTERMEDIARY INSTITUTIONS**	**CONSORTIA**	**SMEs**
ERVET	ASTER	CON.ART.EXPORT	10 SME
API	DEMOCENTER		Members of the
CAN	CERMET	CENTRO UNITARO	consortia
	CERMA	FORME	
	CITER		
	CERCAL		
	QUASCO		
	CENTRO CERAM.		

TABLE 7.1. Organisations Interviewed in Emilia-Romagna.

7.3. CONTEXTUAL INSTITUTIONS

ERVET S.p.A. is the Emilia-Romagna regional development board, an agency responsible for long-term planning in accordance with the Italian and European Union contexts. The Regional Government is ERVET's majority shareholder; minority interests are held by associations of manufacturers, co-operative enterprises and small

businesses; banks and other financial institutions; and the Union of Chambers of Commerce.

The stated ERVET's goals are to:

- foster the establishment of new businesses, large and small;
- organise business support services;
- support viable applications of research findings;
- promote innovative financial services for local operators;
- help create science and technology complexes;
- promote technology transfer;
- enhance the quality of the Region's economic and social system and the qualitative growth of local enterprises.

ERVET carries out its activities in relation to a network of specialised agencies. Some of these provide services to specific industrial sectors cut across the boarder on major themes such as the transfer of new technology, marketing, and financial innovation. Such units operate in conjunction with one-another.

With regard to the employers' associations, the CNA is the Italian handicraft federation which represents 140,000 handicraft business. The term handicraft is used instead of the traditional 'workshop' in order to underline the significance of a modern handicraft business featuring professionalism, new technologies, productivity, flexibility, and export orientated business. The CNA has an office in every province and a major office in all 20 regions of Italy (CNA 1995). It has 8556 shareholders of whom 56 are European consulting firms promoting marketing and exports. The CNA provides services in the domains of finance, accounting, fiscal, insurance, quality, organisation and management, costing, environmental, and marketing - exports.

The API is the other employers' association and represents the SMEs of the province of Bologna. It was established in 1945 and consists of 1200 SMEs, mostly from the metal working sector. API offers specialised consulting services in export and marketing,

economics and finance, administration and taxation, syndicate matters and social insurance, job safety, and personnel management.

Both employers' associations generate their income from membership fees and services fees provided to their members. In order to provide these services, especially marketing and export, to its members, CNA and API use information links with European consulting firms, the Emilia-Romagna information centre - the Aster -, the Eurostat, and other information banks.

The two employers associations also act as political lobbies in order to promote the interests of their members. For example, CNA has a representative in the European Parliament, and therefore it is influential in promoting legitimacy and policy with regards to its members interests.

7.4. THE CONSORTIA ORGANISATION AND SCOPE OF IT USE

The consortia were formed based on geographical proximity, one in each major city, with sectoral specialisation becoming less important, though it must be noted that usually in each province there is a strong sectoral specialisation, e.g. Carpi for knitwear/clothing, and Modena agricultural machinery. Thus, often consortia comprise SMEs from different sectors (see table 7.2).

Typically, each consortium may provide a number of services to the firms with most popular the promotion of exports, collective acquisition of materials, and employment. The consortia may also provide financial services, loans, and investments for their shareholders.

The structure of the consortia is simple. There is a general manager, and each service provided is carried out by a team of permanent clerical staff. Experts are employed to accomplish specific activities, e.g. a consulting firm is hired for targeting export promotion through an exhibition. The general strategy to be followed is defined on an annual basis by the executive committee, which comprises the shareholders who may

also deal with other issues like revising the operational rules of the consortia. The operational costs of the consortia are covered partly by membership fee and partly by profits made through their operations. Table 7.2. provides the details of the consortia studied in the case of Emilia-Romagna.

CONSORTIA	**CON.ART.EXPORT**	**CENTRO UNITARION FORME**
SMEs members	150	80
Headquarters	Reggio-Emilia	Modena
World-wide offices	13 (incl. USA, Australia)	None
Type of Products	Industrial vehicles, pasta, salami, and meat, crafted goods, knitwear, armoured doors, liqueurs and drink beverages.	Textile and clothing, tiles and ceramics, agricultural machinery.
Domains of Services	Marketing and exports	Marketing and exports, purchase of materials, employment, finance and investment.

TABLE 7.2. Profiles & Activities of the Consortia.

A distinctive organisational difference between the two consortia is that the CON.ART.EXPORT uses a dedicated marketing consulting firm to cover the consortium needs while the CENTRO UNITARIO FORME employs consulting firms, including for marketing and export promotion, on a contract basis.

The consulting firms employed by the consortia to conduct specific projects use their own advanced IT/IS. In contrast, the consortia use simple IT, like PCs and fax machines, to perform basic functions, such as word-processing and accounting.

7.5. THE INTERMEDIARY INSTITUTIONS ORGANISATION AND USE OF IT/IS

ASTER provides horizontal services to the industry. It is the major information centre in the region of Emilia-Romagna. Organisationally, there is an in-house core staff of 30 persons while external experts are hired to carry out specific projects, when required. Such projects can be carried out at a local, national, EU, or international scope.

ASTER provides a variety of services, from diagnosis of SME's needs for the selection of best technological solution (like information systems, CAD/CAM, EDI), through to the application of telematics and telecommunication (like teleworking, telecommunication infrastructure), to on-line information services (on local, national, and international basis). Current projects, at the time of conducting this study, include: a pilot study aiming to address the socio-economic issues of EDI development in the SMEs of the clothing and textile sector; and, the launch of a project to develop an intranet between the SMEs for exchange of information.

The use of IT is extensive and covers all domains of the centre's operations. All IT employed is in network form and handles information in a sophisticated way. The centre's information system involves a number of information technologies, such as databases, spreadsheets, videotext, and office technologies.

The information system is the cornerstone of the organisational operation of the centre. Computers and communication technologies support inter-relationships with local, national, and international organisations and information banks.

Vertical is the second type of service provided. Such services are provided by the CITER, CERCAL, QUASCO, and CENTRO CERAMICO to the sectors of textile and apparel, footwear, construction, and ceramic industries respectively. Each centre is designated to undertake several activities in order to help the specific sectoral needs. Typically, such needs may lie in the domains of job market surveys; participation in business fairs and congresses; training for personnel upgrading by carrying out seminars in co-operation with training schools and organisations; research and

development; application techniques and finally product check-up; research and experimentation of new technologies for product improving quality, pollution and energy consumption; and information, data, and documents interchange among firms.

Organisationally, there is an in-house core staff, as in the case of ASTER, though much smaller, while experts are hired to carry out specific projects, when required. These centres collaborate with regional universities and other research institutions in using their laboratory facilities.

INSTITUTIONS	**ASTER**	**CITER** **CERMAL** **QUASCO** **CENTRO CER.**	**DEMOCENTER** **CERMET** **CESMA**
Type of Services	Horizontal	Vertical	Cross-Sectoral
Extent of IT Use	High	Moderate	Moderate
Degree of IS Integration			
. local	High	High	High
. national	High	High	High
. international	High	Moderate	Moderate

TABLE 7.3. Extent of Integration of the Intermediary Institutions at Different Levels.

The use of IT in these centres is modest. It is in a network form in order to retrieve specialised information from related institutions. The degree of integration varies according to the level of context. At the international level, these centres are interconnected with counterpart centres, the World Bank, the Eurostat, EU institutions, while at the local level they are interconnected with the ASTER where relevant

information is filtered and passed to the relevant centre.

The third type of services is vertical cross- sectoral, provided to more than one sector. Centres which fall in this category are the DEMOCENTER which is the centre for the diffusion of industrial automation, the CERMET which is the centre for technological research and consulting, and quality system certification, and the CESMA which is the centre for agricultural mechanisation.

In general, they undertake activities for training on subjects related to quality; EU legislation and directives; technological materials and processes; information on innovation, legislation, markets; process, company, product and instruments certification; laboratory tests on materials, components and products; semi-permanent demonstrations for the publishing of advanced technologies; research and development; and, technical and marketing consultancy.

Their organisational structure, the scope of IT use, and the extent of IS integration is the same as in the case of the centres providing vertical services. The table above provides a synopsis of all the institutions interviewed in relation to the extent of IT use and the degree of integration at different levels.

7.6. THE SMES ORGANISATION AND SCOPE OF IT USE

At the heart of the industrial network organisation are the SMEs which are located in a limited area. They are often geared to specialised sectors and are interconnected by a dense network of relations. Before presenting how SMEs develop networks, it is appropriate to describe how SMEs are structured and organised.

The SMEs in the region of Emilia-Romagna are often family-based with the owner-manager having a personal control and direct supervision of most of what is going on in the company. Their organisational structure is very informal. The SMEs tend to be highly specialised, depending on a series of economic and technical interrelated operations placed between the availability of the raw materials and that of the finished

products.

The SMEs in Emilia-Romagna form enduring webs of relationships with customers, suppliers, family, friends, and trade associations. Competitive behaviour and strategic action (awareness) takes place in a network of existing and established relationships, as much formal as informal.

The SMEs in Emilia-Romagna also belong to employers' associations, the CNA and the API which are the association for handicraft firms and SMEs respectively. Whether a small firm is defined as artisan or small firm is found through the law of ALBO (as it is known), though the associations are open to firms should they wish to join them and it is not unusual to see SMEs being members of the API and vice-versa. This depends on many factors, particularly on the interests of the firms.

The degree to which IT is being used by the SMEs varies. In the domain of production the most advance machinery is used extensively, like computer numerical controlled machines and other IT production machines. Basic IT is extensively used by the SMEs for administrative tasks.

7.7. THE ORGANISATIONAL STRUCTURE AND IS DEVELOPMENT

The flexible specialisation organisation structure in Emilia-Romagna consists of specialised units operating in conjunction with one-another, enhanced by the cross-representation among related institutions and interests. This organisational complexity affects the development of information systems and effects the flow of information.

In order, however, to better understand the development of information systems in the context of flexible specialisation in the region of Emilia-Romagna it is necessary to firstly understand the organisational structures dis-aggregate, at the different levels: SMEs, consortia, and intermediary institutions.

The consortia have a federal form where SMEs get clout in the market place and

financial services through size. Long-term strategy, like investments and market penetrations are also formed at the consortium level. A crucial factor is the leadership abilities of the managers of the consortia to evolve organisations to federalism, which is also culturally distinctive. In particular, much depends on building trust.

The intermediary institutions have a network form and develop relationships which are relatively stable and enduring exchange patterns and collective actions. On the other hand, the SMEs operating within the FS concept transform their organisation from the entrepreneurial to the flex-firm form. The use of IT is extensive at the production level and limited above this level.

The services of acquisition, manipulation, and dissemination of information are provided horizontally, through the ASTER centre. From there every interested party can use ASTER's services regardless of whether it is a regional governmental institution or outsider, like consortia, employer's associations, or private organisations. At the ASTER centre, information is manipulated and subsequently disseminated to the relevant institutions, e.g. information concerning agricultural machinery to CESMA which is the relevant centre, information concerning textile and apparel to CITER, and so on.

ASTER is able to provide on-line searchers at relatively low costs both for strategic and technical information through connections with more than 1000 international information services. To-date ASTER supplies its services to about 4000 firms through numerous information services.

Such services can be seen in the CHANCE project which aims at providing integration of regional firms in the European single market. The European opportunities are collected, translated into Italian and processed to produce targeted and focused reports which are then systematically forwarded to companies in the sectors concerned. Information concerning transfer of technology, access to financial and technical co-operation, promotion of active participation exploiting the innovative and productive potentials of the regional and national industry, and fostering industrial co-operation

with third countries are among those disseminated to the regional firms.

Several regional information systems have been developed by ASTER which provide information on technology and science, trademarks and patents, markets and products, company profiles, import/export, international norms, standards and specifications, etc. Among them are: the "IMPERO" information system which contains data related to location, financial figures, products and activities, on the 55,000 manufacturing firms of Emilia-Romagna; the "RCR" which contains information on the research and technology transfer facilities of the region and allows to identify partners more qualified to research projects; the "Advanced Service Sector" which contains information about regional industrial manufacturing high-tech and innovative products and service companies; and the "Testing and Analysis Laboratory", providing information on firms looking for accredited laboratories that carry out tests and analysis on products or materials for different industrial sectors. All these information services represent useful working tools for the regional SMEs, trade associations, financial institutions, and research centres.

ASTER has set up an information service for technical assistance and innovative support through which SMEs could take advantage of adequate skills to analyse their strength and weak points and to identify potential paths (technological as well as organisational) to reach their targeted results. Through this information system SMEs can define projects for developing new information systems, industrial automation and new process technologies, quality systems according to ISO 9000 standards, total quality, telecommunications, and environmental technologies.

Since 1992 ASTER also become an EC EDI awareness Centre and aims at promoting and encouraging research, development and use of telecommunications services. Currently, they are working on a project called EDITEX, where 11 other European countries participate, aiming for diffusion of EDI technologies in the textile and clothing European industry. Other regional centres which are related to the textile and clothing sector, like CITER, are involved in the project.

7.8. CONCLUSION

The socio-economic strategy of flexible specialisation in Emilia-Romagna enabled SMEs to embrace competitiveness through establishing channels of communication at different levels of communication, and thus having access to information which they would not be able to achieve in isolation. That led them to joint programmes, and co-operation, while maintaining organisational interdependence.

The industrial network of Emilia-Romagna presents a high degree of inter-organisational complexity encompassing a variety of different types of networks, ranging from social through strategic to co-operative, operating at several levels, from regional through international. Networking at the regional level with a simplified organisational structure led to informal channels of communication, i.e. without (or at least non-sophisticated) use of IT to support the information system. Whereas, electronic channels of communication, thus more sophisticated IT is embedded in the organisational system to support it, were found in more complicated organisational structures and higher levels of operation.

In contrast to the FS network of Cyprus, the FS network of Emilia-Romagna clearly showed that information communicated was not only used for day-to-day activities of the firms but also for external information such as data on potential markets and new technology. Successively, intermediary institutions acquired great significant in the FS network as much for the consortia as for the SMEs.

With regards to the SME members of the consortia, no 'peculiar' behaviour was shown, as in the case of Cyprus. The SMEs were very keen in co-operating in different forms, including transferring of power to the consortium level.

PART IV

ANALYSIS AND CONCLUSIONS

CHAPTER 8

Analysis of the Case Studies

This chapter brings together the key issues and insights from the case studies in the light of the relevant literature. The objective is to draw out general conclusions and recommendations concerning the process of organisational change and the development of information systems in the context of flexible specialisation. It also discusses the impact of the particular socio-economic and cultural factors on this process.

The analysis starts by highlighting the findings from the case studies. In the next section, a discussion of the empirical research findings is undertaken based on two perspectives of organisational change and IS development. Subsequently, the implications of the research on the process of organisational change and IS development in the context of flexible specialisation are examined. Finally, the chapter concludes with the main findings derived from the analysis.

8.1. FINDINGS FROM THE CASE STUDIES

Flexible specialisation configuration is a complex and dynamic process. In both case studies, Cyprus and Emilia-Romagna, three organisational units are involved in the process of flexible specialisation: the SMEs; the consortia; and, the intermediary institutions. Together, they constitute an industrial network, as this is defined by Easton (1992) and Hakansson (1990) (see chapter 2).

The SMEs tend to be of a flex-firm form. They are independent organisations and work towards their own aims and objectives and have access to facilities which they could not use otherwise. The ways in which the SMEs are organised and structured are very similar in the two cases of FS. What is different, however, is the operational environment (networking of SMEs with both consortia and intermediary institutions) through which the SMEs have access to services such as know-how, technological capability, and innovation enabling them to overcome constraints emanated from their SMEs' nature.

The second type of organisational units involved are the consortia which tend to be of a federal form. They co-ordinate the interaction of their SME members within the framework of the corporate's overall goals. In both cases the initiative to establish consortia was taken by the SMEs, though they were encouraged by government (or local government) policies and attitudes. In the case of Emilia-Romagna, with regard to attitudes, the successful experience in the agricultural sector acted as a catalyst in this direction. Likewise, with regards to the policies which encouraged co-operation. In the case of Cyprus, the establishment of consortia was limited in terms of both number and scope. Two consortia, the MFC and the Alox, operate for production concerns. In the case of the MFC, a limited exploitation of its production capacity and business potential was found. The other two consortia, the AtoZ and Line-11, which attempted to provide the same range of services as those in Emilia-Romagna, lack both a co-operative attitude and effective organisational structure.

The intermediary institutions tend to be of a network form. They are formally independent but highly interdependent organisations through which know-how,

technological capability, and innovation become available to the SMEs at lower costs than if they were acquiring them on their own. The establishment of intermediary institutions needs a combined effort by both the SMEs and policy makers. In the case of Emilia-Romagna, there is an appreciation of the usefulness of establishing such institutions. Indeed, rich and dense networks of intermediary institutions have become the heart of the FS phenomenon in that case. In contrast, in the case of Cyprus such an appreciation still needs to be built, though two such institutions have been established.

With regards to the development of information systems and use of IT, in none of the three organisational levels of the industrial network in Cyprus were rich information services and communication networks found. In contrast, in Emilia-Romagna they work towards a formal information systems strategy supported by a set of policies, procedures, and principles that would govern the development of information systems and the use of IT within the industrial network.

In summary, there are significant differences between the two industrial networks. The main differences are based on:

- the extent to which functions and responsibilities are co-operative and the consequent degree of integration fostered by the organisations;

- how they perceive the role of IS development; and,

- how cultural and institutional aspects affect the process of organisational change and IS development.

These aspects are analysed in more detail for the case of Cyprus in this chapter. The analysis uses the contextual approach proposed in chapter 4.

8.2. APPLYING ORGANISATIONAL CHANGE AND IS DEVELOPMENT

The information systems literature suggests that organisational change and IS development are partly planned and partly emergent. As it was found in the literature reviewed in chapter 2, the planned change perspective presumes that managers are the primary source of changes, and that these actors deliberately initiate and implement changes (Miles and Snow 1984; Meyer and Goes 1988; Hammer and Champy 1993). On the other hand, emerged change is the realisation of a new pattern of organising in the absence of explicit, a priori intention (Orlikowski 1996), which is realised in action (Mintzberg and Waters 1985).

The distinction between planned change and emerged change, were both found in the FS network of Cyprus and can form the basis for the analysis of the research findings.

8.2.1. PLANNED CHANGE

The notion of planned change can be identified in the case of Cyprus at the initial stage of the formation of the consortia and intermediary institutions. These changes were intended and implemented.

The initiative for establishing the consortia and the IOT were taken by the SMEs owners/managers and policy-makers respectively. In the case of the IOF a combined effort was made. In general, the whole FS initiative in Cyprus was planned organisational change.

The establishment of the two intermediary institutions did not imply any changes of the other organisational units involved in the industrial network. The relationships developed between the intermediary institutions and the SMEs primarily were dynamic, i.e. loosely with limited loyalty.

In the case of the AtoZ and Line-11 consortia the organisational changes initiated had implied that relationships and co-operation would have developed with the SME

members of each consortium which, in turn, would demand changes within the SMEs themselves, specialised by-product. On the other hand, in the case of Alox and MFC consortia the owners/managers of the SME members of the consortia rationalised to establish the two consortia in order to outsource a particular process of their production.

The above planned organisational changes were not aligned to IS/IT developments, with some exceptions in the sphere of production. The SME members of the AtoZ and Line-11 consortia introduced production computer numerical controlled machinery for production purposes. Production computer numerical controlled machinery for production purposes were introduced by the MFC and Alox consortia too. The AtoZ and Line-11 consortia did not introduce any IT at this stage.

Subsequently, however, in the case of the AtoZ consortium the manual information system used for the processing of information between the consortium and its SME members was computerised. As a result of the introduction of the computer-based information system a number of organisational changes were imposed both to the consortium and the SME members. The owners/managers of the SME members commented: "While before we were assuming that a delay of one or two weeks was not a problem, now such delays are not possible"

In the case of the two intermediary institutions, initially minimum IT/IS was used in order to support their operation. In particular, communication networks were developed in order to be on-line with counterpart institutions and other relevant information banks at the international level. IT was also used for integrative purposes, that is to store information and spread it throughout the SMEs on demand basis. The IOF also introduced IT for production purposes, a CAD system. Thus, in general the intermediary institutions established loosely developing information services which were thought to be potentially useful to the SMEs and the consortia.

There were no plans for IS to support management of the operation of the organisational units involved in the FS organisational change initiative.

8.2.2. EMERGENT CHANGE

Two instances of the notion of emerged change can be identified, in the cases of AtoZ and Line-11 consortia. In contrast to the planned changes, which were intended, the emergent changes were realised in the development process of the FS network.

The AtoZ and Line-11 consortia followed the same pattern of establishment, development, and collapse. The word collapse is used here to show the stage at which these two consortia were forced to operate outside their initial goals. This has been the result of a number of conflicts that had emerged between different groups of SME members.

The bigger in size SME members quoted during the interviews that:

> "the smaller in size SME members have benefited more than the bigger in size SME members",

while the SME members not specialising in sofas quoted:

> "customers change their sofas two to three times in their live, but not other furniture. We have lost our market share in selling sofas".

Another group of SME members complained that while they were equal shareholders in the consortium the decisions were taken only by two or three members while the others were ignored. Accusations were also reported that some SME members had broken the initial agreement of not selling products outside the consortium procedure.

In essence, each SME members was viewing its partner in the consortium with suspicion, trying to exploit the partnership for their own benefit at the expense of the others. The fact that the partnership did not manage, despite the attempts, to become export orientated meant that the partnership was used opportunistically by each SME member to become more competitive at the small local market, something which of course could not be tolerated by the others.

As a result of these conflicts, all SME members of the two consortia turned back to their pre-consortium situation, i.e. producing a wide range of products. This implied that the relationships between the SME members and the consortia have ceased to exist. The two consortia now operate on a completely different basis, as traders. They import furniture and sell them through their showrooms.

8.2.3. INTERPRETING ORGANISATIONAL DEVELOPMENTS

In general, the SMEs in Cyprus were willing to participate in the FS network only as long as no transfer of power from the SMEs was demanded.

This can be confirmed by the behaviour of the SME members of the AtoZ and Line-11 consortia which when they reached the facet of developing close co-operation on decision-making, which implied transferring power and high trust, they decided to pull out of the FS system resulting to 'reverse-change' the system.

Otherwise, all the SME members at the initial facet, formation of the consortia and intermediary institutions, were willing to develop inter-organisational relationships. The planned organisational changes were implemented in all organisational units concerned, the consortia and SMEs. This can be explained in different ways. First, the SMEs owners/managers felt that such changes would be beneficial to them. Second, the SMEs took advantage of the scheme which subsidised production machinery. However, this is not true in the case of the Alox consortium since this was established a decade before the introduction of this scheme. Third, and more importantly, the SMEs owners/managers felt that such a change demanded less co-operation and trust between the SME members in each consortium. That is, the SMEs were still the hub firms within this type of organisation, and thus no power was needed to be transferred from the SMEs to the consortium level.

On the other hand, the introduction of computer-based information system in the case of the AtoZ consortium demonstrated the link between IS development and organisational changes. Furthermore, it demonstrated that the use of IT to formalise

processes has a positive impact on the way to conduct business, i.e. more professionally.

Overall, this is a story where some changes were deliberate and intended (planned) while others were emergent and unanticipated. Emergent changes, realised in the FS network of Cyprus, were not planned a priori, rather they were enacted without any particular IS emerging. Yet,

- the SMEs continue to be rather informally managed, without export orientation;

- the consortia have not become particularly vital in the FS economy, so no rich inter-organisational information communication has emerged; and

- as a result, intermediary institutions have a minor role to play.

8.3. IMPLICATIONS FOR IS DEVELOPMENT AND ORGANISATIONAL CHANGES IN THE FS NETWORK OF CYPRUS

This section reconsiders the research questions (see chapter 4) and draws more general conclusions leading on from the above analysis.

From the case studies examined, it becomes apparent that the enabling and strategic role of IT (Scott-Morton 1992; MacFarlan 1984; Porter and Miller 1986) could not be seen by the SMEs owners/managers. They could only see the automational aspect of IT. This, however, does not lead to conclusions as the SMEs in Emilia-Romagna use IT likewise, for production concerns.

The poor use of IT for communication at local level is consistent with Walls' (1993) theoretical perspective, that other more personal modes of communication may be used. The spatial arrangements in the industrial network in Cyprus, and the physical proximity of its inhabitants facilitate informal communication. They often need only

cross the street to communicate, making walking a convenient substitute for electronic communication. Furthermore, over centuries the people of Cyprus have developed face-to-face meeting in a variety of diffuse contexts. This custom still persists in modern Cyprus. The growing proliferation of cellular phones suggests that Cypriots may be willing to take advantage of modern communication methods as long as they do not unduly limit the richness of expression needed for social exchanges and relationship maintenance.

Second, the critical social theory perspective suggests that "communication richness involves not only understanding what the speaker or writer means, but testing the validity claims associated with the action type enacted by the speaker or writer" (Ngwenyama and Lee 1997). While such a test of validity claims will be difficult in the case of a typical e-mail message, it is much more likely in the above types of social exchanges prevalent in Cyprus.

The planned organisational changes were aligned to the strategic business needs (Scott-Morton 1992) of the SMEs and the consortia. However, there was no planned strategy for IS alignment to the business strategy.

A good part of inter-organisational theory is predicated on the assumption that inter-organisational relationships will not occur unless there is awareness of potential or actual interdependence among actors involved (Hall 1990). Lack of awareness, in Cyprus, was emphatic. The owners/managers of the SMEs lacked of awareness on both issues of FS organisation and the role of IS/IT. On the other hand, the 'strategists', though they could understand the organisational issues, lack awareness on the role of IT/IS. A 'strategists' who could see the significance of IT/IS in the FS organisation, during the interview commented that "when you talk about IS to these people they look at you with an incomprehensible expression in their face".

8.4. CULTURAL IMPLICATIONS

In Emilia-Romagna culture has been proved to be influential to the development of flexible specialisation, while in Cyprus it acted as a constraint in this direction.

The Cyprus culture, by and large, is similar to the culture of Emilia-Romagna (e.g. social and family ties, small family-owned business). Theory suggests that social and family ties are factors which explain the development of relationships of co-operation (Johannison 1986; Baker 1990). However, in Cyprus these two factors have not been proved sufficient to drive the development of inter-organisational relationships.

On the other hand, Leach (1991) argues that family-based firms are often torn between the demands for family values and business principles, with family control becoming more important than business growth. In the case of Cyprus it seems that family control of the family-owned firms is of more importance than business growth, which ultimately constrained co-operation.

The concept of time can be used to explain the development of co-operation in Emilia-Romagna. Trompenaars (1994) argues that in synchronic cultures which prevail in the Mediterranean, thus in Cyprus and Italy, past, present, and future are all interrelated so that the expectations of the future accumulated experiences of the past, shape present action. Consequently, the attitude toward time means that past actions of co-operation in the agricultural sector in Emilia-Romagna were passed to the present.

The concept of time can also be used to raise another argument for the negative attitude towards co-operation in the case of Cyprus. The traditional opportunistic behaviour maintained in the Cypriot business society has meant that Cypriot entrepreneurs were unwilling to develop co-operation based on stable relationships which would demand transfer of power and high level of investment.

Finally, one last argument for the negative attitude towards co-operation observed in the case of Cyprus may be found in the Cypriot entrepreneurs' reliance on the underground economy. In chapter 5, it was mentioned that the underground economy, including non-declaration of income and activity, personal use of business assets, and other forms of tax evasion could have played a role in the capital formation and growth of Cypriot firms. Co-operation in an industrial network, which formalises all information flows and directs them away from the direct control of the firm, would undoubtedly be considered a threat to such underground economic behaviour.

The flexible specialisation case presented here and the theories derived from it were based upon the premise of co-operation and trust. These assumptions may hold in Emilia-Romagna and the other cases presented in chapter 3 (Jutland and Baden-Wutterberg). These are the same societies where the socio-economic theory of flexible specialisation was originally developed and has now become commonly accepted. However, when the co-operation and trust are replaced by opportunism, a tradition in the business society of Cyprus, the concept of flexible specialisation is at best problematic in the context of Cyprus.

8.5. CONCLUSIONS

Following the above discussion, a number of conclusions can derive. These are classified on three dimensions: organisational aspects, information systems aspects, and cultural and institutional aspects.

Organisational Aspects

a. Initially, organisational changes took place at the inter-organisational level, (i.e. the development of new organisational units, intermediary institutions and consortia), based on the planned change perspective. The SMEs, at this stage, remained rather unchanged in relation to the intermediary institutions, while in relation to the consortia SMEs either discharge a process or specialise by-product;

b. After the initial initiatives, there was little further organisational development. Rather than developing rich interrelations between SMEs, consortia, and intermediary institutions, the industrial network remained largely ineffective.

Information Systems Aspects

a. Without reaching a high degree of activity in the flexible specialisation configuration no demand for information services emerged ;

b. Thus, only a minimum infrastructure was developed in par allel with the initial organisational changes;

c. Further development of information systems emerged as the complexity of inter-organisational activities increased;

d. At the level of SMEs (the most active organisations of the Cypriot FS case) no strategic role of information systems has emerged. Without export orientation there is little incentive to formalise management and use information resources.

Cultural and Institutional Aspects

The roots for the poor results of the FS experiment in Cyprus and the consequent limited IS infrastructure can be sought in the cultural and institutional aspects of the Cypriot context.

a. This research supports the argument made by researchers regarding flexible specialisation on the significance of cultural and institutional factors. More specifically, in the family-owned situations with the 'father' as manager, family control is becoming more important than business growth which constrains co-operation and thus the development of inter-organisational changes;

The implications of this to the information systems is that this culture is better served by informal information communication, based on personal relations and mistrust on formal information sources. In other words:

i. owners do not feel comfortable with the new technologies; and

ii. they would not trust their employees to take control.

b. Finally, the opportunistic business approach and the underground economy found to exist in the business society of Cyprus have both constrained co-operation and prohibited the development of inter-organisational business relations and formal information systems.

CHAPTER 9

Conclusion

9.1. OVERVIEW OF THE RESEARCH

The phenomenon that this thesis has investigated is the relationship between organisational change and information systems development, in the case of an effort to implement flexible specialisation in Cyprus. The advent of advanced information and communication technologies has been seen as the markpoint for SMEs in certain regions to embrace competitiveness by being organised around flexible specialisation principles. However, from the extensive literature review and the conclusions drawn from the review of three classical flexible specialisation cases, presented in chapter 3, it became clear that flexible specialisation theory has not been concerned directly with the issue of organisational change and information systems development. In the field of information systems too the relationship of organisational change and information systems developments remains ambivalent. It tends to be assumed that the use of IT plays an enabling role

in the realisation of new organisational schemes. We started with the working assumption that FS theory does not provide adequate guidance to form IS plans, and therefore we directed our effort to the emergent processes of organisational change and IS development.

Indeed, the case study in Emilia-Romagna revealed a closely related organisational change and information systems development. The in-depth study of the content of the process of the FS in Italy revealed a complex inter-organisational structure supported and in some instances driven by the sophisticated use of IT. This inter-organisational complexity has been achieved through a high level of co-operation found to exist in Emilia-Romagna.

In contrast, in the case of Cyprus, the case studies revealed poorly configured organisational structure supported largely by informal and simple computer-based information systems. Organisational change and information systems development seem indeed to be inextricably linked, as the IS literature suggests, but the Cyprus case suggests a negative attitude. The poorer organisational structure the less information systems development needs emerged. In other words, IS innovation can not drive organisational development. IS innovation does not even find ground to develop in poorly conceived organisational change intervention.

The analysis of the case studies showed the significance of the following cultural factors: family bonds; business opportunism; and underground economy. This research suggests that when the cultural aspects of a socio-economic context are misjudged, a vicious circle of organisational change and IS innovation may result in faulty organisational change and consequently IS development initiatives remain void of direction and support. Consequently poor formal information infrastructure perpetuate the persistence of old organisational culture and continue to be an obstacle to the realisation of the initially intended organisational objective.

9.2. RESEARCH CONTRIBUTION

According to Walsham (1995), there are four possible types of contribution of interpretive case studies: the development of concepts; the generation of theory; the drawing of specific implications; and, the contribution of rich insight in the subject matter.

9.2.1. THEORETICAL CONTRIBUTION

The case studies provided an insight into the organisational roles, the structural and social behavioural characteristics (e.g. co-operative attitude, opportunistic behaviour, etc.) of the organisations involved in promoting FS strategy. This is extremely valuable knowledge considering the fact that human actors are located in the centre of such a strategy.

This research shows that the more established and active the industrial network configuration the more demand emerges for information services. To this relationship a third component, the cultural, interacts. Each of these components does affect and is affected by the other.

The theoretical premise that is derived from this research is that different organisational changes and IS development momentum are generated in different cultural conditions which in turn affect the perceptions of organisational actors and thus their everyday actions and behaviour. Thus, there is a need for these perspectives to be augmented with additional strategies that, as a precursor to development, examine the existing patterns of culture, co-operation, trust (distrust) and opportunism, in the development situation and take them into account for devising a development and implementation strategy.

9.2.2. PRACTICAL CONTRIBUTION

For the community of policy makers, owners/managers of SMEs, and IS developers who face the challenge of promoting FS strategy a number of practical suggestions can be made. In general, policy makers acting as "strategists" for promoting FS

would benefit from the research deliverables through a deep understanding of their roles. Likewise, for the owners/managers of the SMEs involved.

Indications of the positive practical contributions derived from the feedback received by the case study participants. The research findings on the organisational aspects have been particularly timely in the case of Cyprus as a re-appraisal of the FS process is undertaken in order to identify potentials and constraints to further boost the FS configuration. Specifically, policy makers consider how to overcome institutional and cultural constraints to further develop the organisational changes, while the owners/managers of the SMEs are more interested in better understanding the co-operating relation principles leading to efficiency. In contrast, the policy makers in Emilia-Romagna are more curious of the implications of cultural and institutional factors on organisational change and IT utilisation, as it was clearly demonstrated during the interviews.

In general, the research findings could contribute in bringing closer theories and practices of IS implementation aspects in the context of FS. The understanding of the importance of the socio-economic context and how this affects beliefs and perceptions could contribute to the design of more realistic methodological approaches of implementation. These instruments can primarily facilitate the perceptions of owners/managers of the SMEs. For the 'strategists' it can provide an indication of the organisational, technological and cultural constraints and potential for implementation.

Understanding of the pragmatic aspects of the research findings is the foundation of FS implementation and it should become part of the FS concept. Realistic roles of all actors involved for promoting these aspects in the context of FS will become clearer. Successively, in order to break up the vicious circle of organisational under-development and poor IS infrastructure and start up a virtuous circle of organisational development enabled by IS development , the following recommendations are made:

Starting with a cordinated, systematic, and pragmatic campaign in order to create awareness to all actors involved in promoting FS strategy. Why FS strategy and not an alternative? How it can be achieved? Which problems may arise and how they can be overcome? Within this action the importance of organisational co-operation and the significance of IT/IS use should be clearly explained and, if possible, demonstrated practically. Without creating awareness to all the actors involved for the significance of implementing and the consequences of not implementing FS strategy the actors' interest can not be aroused. This action needs to be taken at two levels: initially by experts targeting decision-makers and politicians; and as soon as decision-makers and politicians are convinced they themselves should target owners/managers of the SMEs.

At this stage politicians and decision-makers should announce practical measures, incentives, to the direction of the SMEs. Such practical measures should incorporate elements that will avoid opportunistic behaviour by the owners/managers of the SMEs. For example, the programme which subsidises 3% on exports (see chapter 5) should be restructured and linked with programmes of modernisation of the SMEs in the domains of organisational co-operation, use of technology, and the training of employees. In this way, export orientated firms will be directly encouraged to export and in parallel pushed to upgrade their infrastructure and ultimately their competitiveness.

A final necessary action is the establishment of a multi-disciplinary team of experts (to include information systems specialists) who will conduct appraisal studies of how the whole assignment is progressing. In particular, the team should take a pro-active role of assessing different developments, establishing organisational units (e.g. intermediary institutions and consortia), setting IS infrastructure, in order to yield results. Successful cases create confidence and enthusiasm as well as avoiding any cultural and perceptional hesitations. On the contrary, unsuccessful cases create disappointments and re-enforce any pre-existing hesitations.

9.3. LIMITATIONS AND FURTHER RESEARCH

9.3.1. RESEARCH METHOD LIMITATIONS

In this research the case study method was used. From an interpretive epistemological stance the validity of the results does not depend in a positivistic sense, but on the plausibility of the inductive reasoning used in analysing the case study findings and the drawing of conclusions from them (Lee 1989; Orlikowski and Baroudi 1991). However, there is always a risk of improper interpretation of the data collected as it is highly dependent on the ability of the researcher to understand the broad cultural conditions and objectives of the organisations and actors.

A major problem faced in the case study of Cyprus was the lack of documentation as much from the SMEs side as from the consortia and to a lesser extent from the intermediary institutions. This, however, was compensated by the fact that interviewees were very open to this research and spent many hours of discussion on the various issues. Additionally, all the persons with whom this research started, remained when it finished, except for one case which was not significant, and thus sequence in the views was achieved.

The last point to address concerns the contextualist analysis used. Pettigrew (1985) describes an organisation as a continuous process with a past, present, and future, while at the same time he refers to an organisation as part of the focal context. This implies that there is a difficulty to distinguish analytically between processual and contextual changes. As this limitation was known in advance, the case study of Emilia-Romagna was used as a reference point throughout the analysis. This allowed us to in most of the cases to be able to distinguish between processual and contextual changes by triangulating the outcome.

9.3.2. IMPLICATIONS FOR FURTHER RESEARCH

Since the findings of this research indicate that the context can both facilitate and inhibit the process of organisational change and information systems development, research is needed to understand the role of the context. In particular, analysis of existing levels of trust and co-operation in study of the role of IT in organisations is needed as well as an examination of the impact of IT on trust and co-operation.

Moreover, the broad inter-disciplinary approach taken in this thesis opens up a wide range of further research opportunities not only for information systems scholars, but also for those studying organisational theory, industrial economics and geography.

The different institutional and socio-economic contexts of the two cases, Cyprus and Emilia-Romagna, had different implications on the process of organisational change and IS development. That observation raises methodological issues, that is: the process of organisational change and IS development cannot be simply investigated in limited contexts, such as the business organisation context. It has to take into account the particular socio-economic context within which study organisations are located.

APPENDICES

APPENDIX I

This appendix lists the names of the persons participated in the exploratory field.

Name	Position	Organisation	Sector
G. Hatzianastasiou	General Manager	Planning Bureau	Government
A. Stamatis	Manager	CDB	Institution
A. Petrides	General Manager	Sunshoes Ltd	Footwear
S. Spyrides	Financial Controller	Sunshoes Ltd	Footwear
J. X. Nemitsas	Sales Director	Nemitsas Industries	Metal-Working
Dr. L. Aristodemou	General Manager	Metalco	Metal-Working
J. Christofi	Financial Controller	KEAN	Soft Drinks

APPENDIX II

CASE STUDIES PROTOCOL

I. PROCEDURES

1. Initial Scheduling of Field Visit

A. Review of Preliminary Information

B. Clarification of Access Procedure

C. Special Documents

2. Determination of organisations and persons to be interviewed

A. Macro-level

* Planning Bureau	- Cyprus
* Cyprus Development Bank	- Cyprus
* Industrial Training Authority	- Cyprus
* ERVET	- Italy
* API	- Italy
* CNA	- Italy

B. Intermediary Institutions

* Institute of Technology	- Cyprus
* Institute of Fashion	- Cyprus
* ASTER	- Italy
* DEMOCENTER	- Italy
* CERMET	- Italy
* CESMA	- Italy
* CITER	- Italy
* QUASCO	- Italy
* CENTRO CERAMICO	- Italy
* CERCAL	- Italy

C. Consortia

* AtoZ - Cyprus
* Line-11 - Cyprus
* MFC - Cyprus
* Alox - Cyprus
* CON.ART.EXPORT - Italy
* CENTRO UNITARIO FORME - Italy

D. Small and Medium Enterprises (SMEs)

* 20 SME members of the consortia studied in Cyprus
* 10 SME members of the consortia studied in Italy.

II. CASE STUDIES PROTOCOL AND QUESTIONS

1. Macro-level

[Targeting national decision-makers.]

NAME OF THE DEPARTMENT:

NAME OF THE INTERVIEWEE:

POSITION:

In 1987 the government was advised to adopt an FS strategy.

- How and why the government reacted positively or negatively?

- Which governmental departments/agencies are possible to implement and monitor the FS strategy?

- How are these departments / agencies structured?

- Have they produced any documentation of their action?

- Has this original policy action changed since then?

- If yes, how and why?

- In designing the above policy, did you consider any particular forces (social aspects, IT, co-operation, etc)?

- What is your vision about this strategy (further action, role of IT, etc.)?

2. Intermediary Institutions

[Targeting external (facilitating) agencies.]

NAME OF THE ORGANISATION:

NAME OF THE INTERVIEWEE:

POSITION:

- General context within the organisation operate (aim, objectives, size, departments, expertise, etc)

- Relationships with consortia (effectiveness, degree of co-operation, etc)
  - Any information bank which can be used by consortia?
  - Any IS to enable fast exchange of information?
  - Any other relationship (mechanism for IT transfer)?

- How do you see macro-economic policy affecting the whole concept of your operation? Any suggestions for further action?

- What is your vision about the future role of your organisation?
  - On promoting FS or any other strategy?
  - Any need for other intermediary institution?

- Bearing in mind the general socio-economic context of Cyprus, how do you feel about this strategy?
  - More specifically with regards to the ability and notion of using IT/IS?

3. Consortia

NAME OF THE CONSORTIUM:
NAME OF INTERVIEWEE:
POSITION:

A. ESTABLISHING THE CONSORTIUM

- General Background (date, number of firms, etc)

- Why and how (the process) the consortium was established?
  * management (decision-making, process, power of the consortium and autonomy of the firms, etc)

- Inter-organisational relationships
  * Customers, Suppliers, Subcontractors (form?)
  * Agencies [CDB, ITA, IOT (collective action - technology diffusion, research, information on fashion, training, finance, marketing)

- What IT/IS did you introduce in the process of forming the consortium?

- Describe any evolution taken place with respect to IT, management, IS etc? Why and how?

- With regards to IT/IS, how do workers react?

- View about national policy

- What is your vision about the future of the consortium with respect to management, IT/IS, co-operation with other organisations, and macro-economic policy?

4. Small and Medium Enterprises

NAME OF THE FIRM:

NAME OF THE INTERVIEWEE:

POSITION:

A. PRE-CONSORTIUM SITUATION

- General Background
- Ownership (family-based, etc)
- Product line
- Structure (centralisation-decentralisation, etc)
- Labour (skills, training, job classification, etc)
- IT (what? if any)
- IS (whether formal or informal, computer-based or not)
- Management (decision-making power and process)
    * running the firm
    * specialised matters (external advisors)

B. CONSORTIUM

- Why did you decide to join the consortium?

- How (process) the consortium was established?

- How your firm was affected (organisationally, IT, IS, etc)

- Relationships (consortium, and external organis. levels)

- What is your feeling and vision about the consortium?

C. EMPLOYEES QUESTIONNAIRE

NAME OF THE EMPLOYEE:

POSITION:

NUMBER OF YEARS WITH THE FIRM:

- Hierarchy (to reach manager). Where do you report? Then?

- Job rotation. How many tasks do you perform? How often do you rotate task?

- What was your role in the firm before the establishment of the consortium?

- How your role described above changed/affected after the establishment of the consortium?

- Training. Are willing to attend a training course? Why?

- How do you see your role affected by IT/IS? How do you feel about it?

APPENDIX III

This appendix lists the names of the interviewees participated in the empirical research. They are classified according to the organisation represented, professional status, and number of meetings.

Organisation	Interviewee's Name	Position	No. of Meetings
Macro-level			
Planning Bureau	G. Hatzianastasiou	General Manager	1
	Dr. S. Matsis	Planning Manager	1
	Dr. S. Matsis	General Manager	2
CDB	A. Stamatis	Manager of Consultancy	1
ITA	K. Konstantinides	Human Resources Manager	1
ERVET	R. Righetti	Information Research Service	1
	R. Malusardi	Economists	1
API	L. Coradeschi	External Trade	1
CNA	O. Grenzi	Regional Manager	1
Intermediary Institutions			
IOT	Dr. K. Konis	General Manager	2
	A. Georgiou	Economic Advisor	1
IOF	K. Avraam	President of the Sector	2
ASTER	V. Bandini	European & International Projects	1
	D. Sica	Information Service	1
	D. Facchini	European & International Projects	1
	B. Di Piazza	European & International Projects	1
	E. Pappini	Innovation & Technology	1
DEMOCENTER	P. Onesti	Director	1
CERMET	R. Trippodo	General Manager	1
CERMA	Dr. L. Manzari	Manager	1
CITER	P. Rossi	Director	1

QUASCO	I. Cocconi	Director	1
CENTRO CERAM.	C. Palmonari	Director	1
CERCAL	V. Casanova	Director	1

Consortia

AtoZ	A. Anastasi	General Manager	3
	K. Anayiotos	Sales Manager	1
Line-11	K. Erotokritou	Director	1
MFC	X. Xenophon	Manager	1
Alox	D. Panayi	Manager	1
CON.ART.EXPORT	A. Salsi	Director	1
	B. Warchol	Marketing	1
CENTRO UN. FOR.	P. Giovannivi	Director	1
	M. Ferreri	Marketing	1

Small and Medium Enterprises (SMEs)

The owners/managers of the 20 SME members of the consortia studied in	Cyprus	20
The owners/managers of the 10 SME members of the consortia studied in	Italy	10

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