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The significance of context in information systems and organisational change

Chrisanthi Avgerou
London School of Economics

Abstract

This paper argues that it is of crucial importance that Information Systems (IS) research and practice associates technology innovation with the context within which it is embedded. It identifies three principles to be followed in order to address the contextual processes involved in IS implementation: first, technology innovation should be considered in relation to socio-organisational change; second, analysis should consider not only the local organisational, but also the national and international context; and third, analysis should consider both the technical/rational decisions and actions involved in the innovation process, and the cultural, social and cognitive forces of such a process. These principles are demonstrated with the analysis of a case study of organisational reform in Cyprus.

Keywords: Socio-economic context, information systems, organisational change, flexible specialisation, Cyprus

Introduction

A great deal of effort in information systems research has been directed towards developing general knowledge for the implementation of information technology innovation without considering in a systematic way variations of the organisational and the broader context within which the innovation is embedded. Many of the conceptual frameworks and normative models that guide information systems (IS) practitioners draw from such research, contributing into a professional tradition of 'best practice' irrespective of contextual particularities. The tendency to prescribe and apply general courses of action in the implementation of technology is compounded by trends in the business literature - such as TQM and BPR – and the 'globalisation' discourse which tends to suggest the exertion of uniform economic imperatives around the globe.

Such general trends support a clear rationale regarding the diffusion of information and communication technologies (ICT) in developing countries: not only ICT is an imperative for

taking part in the global economy, but there are standard ways that it should be used, and specific organisational features that it should aim at supporting. Many countries, corporations, influential aid institutions and management and IT consultants have adopted policies, strategies, and practices based on the assumption of universal imperatives, globally valid business objectives, and general patterns of professional action regarding the exploitation of the potential of the new information and communication technologies (Schware and Kimberley 1995; Talero and Gaudette 1995). Such an a-contextual attitude to ICT exploitation is effective in spreading powerful messages about the significance of ICT in the contemporary economy, but it entails high risks of misguiding and frustrating local efforts to make sense and appropriate new technology.

The significance of considering the context of IS innovation in developing countries cannot be over-emphasised. Invariably IS innovation in developing countries involves the transfer of technologies and organisational practices which were originally designed and proved useful in other socio-organisational contexts (Avgerou 1996). Their potential value, fit in the local socio-organisational conditions, and feasibility of use cannot be taken for granted. Indeed, there is substantial evidence indicating the significance of addressing the local context for the exploitation of the potential of new information and communication technologies in developing countries (see for example (Bhatnagar and Odedra 1992; Odedra-Straub 1996; Avgerou and Walsham forthcoming; Barrett, Sahay et al. forthcoming).

This paper is based on the assumption that ICT does not deterministically imply any organisational results, and seeks to examine the relationship of the process of ICT implementation with its context. To that end, in the next section I review the way context is addressed in IS studies. I argue that a suitable approach to contextualist studies of IS innovation in developing countries has the following characteristics: it considers IT innovation in relation to socio-organisational change; it considers not only the organisational, but also the national and international context; it considers not only the technical/rational decisions and actions involved in the innovation process, but also the cultural, social and cognitive forces of such a process.

Then I apply such a contextualist approach to discuss the case of an effort to emulate organisational structures for small and medium enterprises (SME) collaboration in Cyprus. Analysis by the contextualist principles identified in this paper reveals the reasons why no substantial ICT infrastructure was developed to support the organisational reform in this case.

Context in IS research

It could be argued that all information systems studies are contextual, since they address issues of technology implementation and use within organisations rather than in a laboratory setting. Thus, by the nature of the object of its study, information systems research considers a changing entity within its environment. However, studies of information systems vary in terms of a) the content of change they focus on, b) the delineation of the environment they consider, and c) the way they conceptualise the process of change in relation to the environment within which it unfolds.

Content in relation to context

The question of the relationship between content and context refers to whether an IS study focuses on technological change or the interaction between technological change and socio-organisational change. A great deal of IS research has been pre-occupied with the former, mainly in the form of the study of the development, management and exploitation of IT-based systems [1]. Another influential stream of IS research has been devoted to the study of the behavioural characteristics which influence or inhibit particular technological change, or the way technical innovation affects behavioural aspects of an organisation. But often in such analytical studies technological change is considered distinct from the organisational and social processes taking place around it. Technological change is the 'content' of change studied, and the socio-organisational circumstances under which it happens is the 'context' of change.

Such separation of technology as content from the organisation and society as context has led to the development of useful specialised knowledge that formed the basis of IS professional practice. For example, focusing on the technical systems development process by assuming that the organisational context will provide the 'requirements' for the technology allowed a set of professional practices for the engineering of technically robust and to a large extent relevant technologies. Yet, it was well known that organisations themselves are changing by the very fact of fostering systems development initiatives, and therefore it is unrealistic to expect to determine any definitive requirements.

[1] See for example the literature on information systems development(Olle, Sol et al. 1986; Avison and Fitzgerald 1996), management (Earl 1989; Lacity and Hirschheim 1993), and strategy (Earl 1987). The main concern has been action to develop effective technologies, to manage them, and to exploit them effectively. To that end the organisational and social environment is often part of the study as a source of opportunities, or constraints for the technical innovation but organisational and social change unfolding in interaction to the technical innovation is not part of the object of study.

A closer relationship between technology and its social context was first suggested by the 'socio-technical' researchers in the 1980s, who put forward the concept of information systems as social systems (Land and Hirschheim 1983). A stream of research elaborated on the social aspects and consequences of information systems innovation in organisations (Kling 1980; Lyytinen and Lehtinen 1984). Research on the social dimensions of IT-based information systems in the 1990s continued and indeed increased its theoretical sophistication, drawing from several theoretical and epistemological traditions of the social sciences (Lyytinen 1992; Walsham 1993; Hirschheim, Klein et al. 1996; Introna 1997). Such theoretical discourse, feeding into and informed by pragmatic concerns about the social effects of new technologies has recently become a highly visible part of IS research, (see for example (Baskerville, Smithson et al. 1994; Orlikowski, Walsham et al. 1996).

Particularly influential in the more recent socio-technical discourse on information systems are the theoretical ideas drawn from the social studies of science and technology of the last fifteen years (see, for example (Bloomfield, Coombs et al. 1997)) which have challenged the widespread belief that science is the result of pure reason and disputed the view that technology determines social effects.

Theoretical ideas on the duality of technology (Orlikowski 1992; DeSanctis and Poole 1994), social constructionism (Bijker and Law 1992; Grint and Woolgar 1997), and actor networks (Callon 1991; Latour 1991; Akrich 1992; Law and Callon 1992) have contributed to a conceptual perspective for considering IT innovation *in interaction* with the changes simultaneously being undergone or pursued by people, institutions, other socio-technical hybrids in an attempted organisational change.

IT innovation and its social context are so intertwined that, as Callon and Law have argued, a distinction between technology as content and society as context is a simplification obscuring the complex processes where technology and human actors jointly take part in forming socio-technical entities (Callon and Law 1989). In the vocabulary of actor network concepts, the object of inquiry of such studies is the formation of the 'heterogeneous networks' of IT-supported organisational processes. The technical and the social are not juxtaposed as two alien domains.

Viewing the content of change associated with information systems innovation as a 'heterogeneous network' conveys more accurately what the socio-technical perception of 'information systems as social systems' has been struggling to connote. It suggests that what

is generally called ‘information system’ in the jargon of practitioners as well as academics cannot be meaningfully for anybody (including engineers) be restricted to computer or communications application within an independently delineated social environment. Technical artefacts such as hardware, software, data in paper or electronic form, carry with them engineers with the conventions of their trade, industries that sell, install and support them, ‘users’ who understand their significance and interpret the way they should be put to action according to their circumstances, consultants who convert them from symbol manipulating machines to ‘competitive advantage’.

In other words, the content of change considered in IS studies should not be technology innovation but the change of heterogeneous networks of institutions and people within which ICT is called to play a role.

The boundaries of contextualist studies

Information systems studies have been concerned mainly with IT innovation processes that take place inside organisations. The context of change considered by such research – seen either as technology innovation or as interacting technological and social change - is therefore the organisation. Research on information systems development is a good example of focusing within organisational units. From the predominantly engineering (DeMarco 1978; Yourdon 1989) to the social-theory-driven conceptions of systems development (Mumford and Weir 1979; Hirschheim, Klein et al. 1995; Hirschheim, Klein et al. 1996) the factors and actors considered are confined within the boundaries of an organisation. Other streams of research considering the organisational context are the web models analysis by Rob Kling and his colleagues (Kling and Scacchi 1980; Kling and Scacchi 1982; Kling 1987) and the soft systems methodology for the analysis of information systems in relation to human activity systems (Checkland 1981). More recently structurational analyses of IT by authors such as Wanda Orlikowski and Geoff Walsham (Orlikowski 1992; Walsham 1993) added particularly interesting new insights of the organisational context by elaborating on the processes through which ICTs are shaped under the influence and at the same time contribute to the shaping of the social relations of the organisations within which they are introduced.

In several areas of information systems research the focus of study extends beyond the single organisation and includes aspects of the organisation’s environment. Widely influential, at least in terms of informing practice, has been the research that seeks to address the strategic potential of IT and organisational change. The information systems literature has highlighted

the existence of competitive pressures on organisations and sought to provide guidance on the actions management should take to harness the potential of IT in order to secure a competitive position of a firm within its environment (Porter and Millar 1984; Earl 1989; Scott Morton 1991; Hammer and Champy 1993). Such studies tend to adopt a contingency analysis, suggesting that organisations choose courses of action according to their assessment of the type of environment they are faced with. They do not elaborate on the process through which a particular change is related to its context.

To study the processes of change occurring when new information and communication technologies are introduced in organisations in relation not only to the organisational context, but also their national environment several researchers adopted a mothod of enquiry proposed by Andrew Pettigrew, initially for the study of strategic organisational change (Pettigrew 1986).

Pettigrew's contextualist analysis focuses on 'the event in its setting', and studies the history of emergent changes in an organisation, as they are shaped by the organisation's social, economic, and political context. To that end the researcher should delineate a set of levels of context and strive to understand the way these levels are connected, using an appropriate theory of the process of change concerned, capable to explain how this process is constrained by its context and also shapes its context. The context here is not seen only as a barrier to action, but as essentially involved in its production

Such a contextual study of a phenomenon involves the interconnection of two directions of analysis: (a) a processual or horizontal analysis which refers to the sequential unfolding of events in historical, present and future time and (b) a vertical analysis which traces the interdependencies between higher or lower levels of context (such as the level of the organisational context and the level of the national context) within which a process has been unfolding.

The contextual approach has been used in several information systems research studies (Avgerou 1989; Madon 1993; Walsham 1993) which saw the process of ICT implementation taking shape in an interplay with social and cultural aspects of both the organisational and the broader national environment.

Conceptualising the process of change

There are two different types of theories of the process of IS innovation inside an organisation and in relation to the organisation's broader environment: those which consider

such processes of change as 'rationally' planned interventions, and those which perceive them in terms of situated action involving political and subjective aspects. The most frequently told story in the IS literature is of a well calculated process of choice and methodical development of technologies to fulfil particular organisational requirements and thus to enable desirable improvements, either of operational or strategic nature, as for example the ideas on strategic planning and business process re-engineering (Earl 1987; Hammer and Champy 1993). In the 1990's the technological possibility of inter-organisational information systems, such as EDI and electronic commerce has fuelled a new shift of research emphasis on processes cutting across organisational boundaries (O'Callaghan 1998). Also, as macro-economic restructuring presented opportunities for externalising organisational functions for the development and use of information systems, a stream of research on 'outsoursing' has addressed the new possibilities of interaction of an organisation with service providers and sought to inform prudent decision making and organisational restructuring (Lacity and Hirschheim 1993; Willcocks, Fitzgerald et al. 1996).

The view that general 'rational' principles can be discovered to guide the successful implementation of information systems in order to achieve unambiguous organisational objectives was challenged by pointing out the subjective, apparently 'irrational' elements of actions within organisations which interfere with 'rational', planned, and methodical actions and often drive the overall organisational performance. The stories told by such studies present processes of social action situated in particular organisational settings. The development and use of computer technologies have been perceived as intertwined with the social fabric of organisations, and it is seen as emergent, incremental, more accurately characterised as improvisation rather than pre-calculated (Ciborra 1991; Ciborra and Lanzara 1994; Orlikowski 1996).

The distinction between the technical/rational and situated approaches to the study of information systems is a manifestation of a more fundamental theoretical distinction in the study of change in organisations and the relationship between action in an organisation and its context. The theoretical underpinnings of the technical/rational perspective that emphasise planned action can be traced to the resource dependency theory (Lawrence and Lorsch 1969; Pfeffer and Salancik 1978). This school of sociological thought attempts to explain the survival and development of organisations in terms of the strategic choices available to organisations that are seen to be interdependent to their competitive environment to secure the necessary resources for their survival. Resource dependency theory seeks to promote the

decision making capacity of organisational management, and has been widely influential in business management literature.

An influential alternative perspective is the institutionalist theory, based on the premise that technical-rational norms of competition and strategic behaviour do not adequately account for the actions and structures of organisations. It postulates that we cannot explain what is happening in organisations by considering only the 'rational' actions of managers and technology experts, and provides a conceptual platform to study the 'irrationalities' stemming from the institutional context of organisations as well as from the cultural systems embedded in them.

This stream of theory has powerful insights to offer to the inquiry of the way ICT is implicated in organisational change. The core argument in institutionalist theory is that formal organisational structures and processes are maintained not because they, necessarily, constitute efficient ways of carrying out complex activities, but because they are sustained by powerful myths, that is by meaning laden public knowledge about how organisations should function (Meyer and Rowan 1991). In modern societies such myths are rationalised, impersonal prescriptions, through which certain practices are taken-for-granted as efficient, without evaluation of their outcomes. For example, professional roles carry a strong element of rational myth, as they legitimate individuals' activities on the basis of expertise and not by evaluating the results of their actions.

The institutionalist conception does not deny that action in organisations involves calculated choices and is driven by concerns for efficiency. It complements efficiency-concerned accounts of organisations with elements associated with the social nature of the organisations themselves and their environment. Institutional forces may be social, cultural, or cognitive in nature. The sources of such forces may be other formal organisations such as trade partners or competitors, formal legislation, professionals, or the collective values of the society that sustains the organisation. Their significance lies not only in that they determine the legitimacy of particular organisational forms, actions, or missions, but also in setting the factors that need to be taken into account in the choices of techical-rational action.

DiMaggio and Powell (1991) identify three distinct forces stemming from the broader environment of an organisation - its organisational field - that influence its actions and structure: coercion, imitation, and normative professional conduct. Coercive pressures may be formal or informal, exerted through force or persuasion. They sanction the legitimacy of

organisational structures, processes, and outputs. The clearest source of coercive pressures is government mandates and the legal framework of the regional, national or international context of an organisational field. For example organisations are obliged to adopt specific accounting practices, safety procedures, and pollution avoidance mechanisms.

Mimetic mechanisms refer to the voluntary acquisition of particular characteristics of structure and process by emulating other organisations seen as successful. It is seen as a way of coping with problems which don't have clear technical solutions, or addressing uncertainties and ambiguous threats or opportunities. More generally, organisations tend to model themselves after other organisations, rather than to design totally new structures and patterns of behaviour on the basis of efficiency plans. Swanson and Ramiller (Swanson and Ramiller 1997) propose the term 'organizing vision' to describe the adoption of IT innovations. They argue that decisions for the development of technically innovative information systems are influenced by the general views about the value, entailed risk of new technologies or business processes created by a heterogeneous network of actors in the inter-organisational community where an organisation participates.

Normative pressures refer primarily to the effects of professional practice. Professionals convey a combination of cognitive and regulatory norms that legitimate their occupational autonomy. Such norms are produced and maintained through formal education and training, as well as through professional associations.

It is important to note that the institutional forces exerted on an organisation may be contradictory. Different institutional agencies in the local environment of organisations may exert conflicting pressures; an organisation may receive both local and international or 'foreign' institutional pressures or models for imitation; and particular aspects of the historically constructed taken-for-granted structures and processes may be in conflict with emerging new rationalised myths.

Lessons for contextualist analysis

From the review of the three aspects of contextualist research identified above it is now possible to derive principles for the study of information systems, and more specifically for efforts of information systems innovation that involve the transfer of technology or organisational features.

First, in such cases it is important to address technology innovation imbedded in, and indeed inseparable from processes of social change. The object of study of information systems

research should be the ICT supported social activities of an organisation, or a network of organisations.

Second, analysis should be extended to address the socio-technical process of IS innovation across layers of context, from the international, through the national or regional, to the local organisational. Innovation inside an organisation is rarely a result of its 'free choice' and action; it is to a large extent determined by events, trends, pressures, opportunities, or restrictions in the international or national arena.

Third, IS innovation should be considered as a combination of technical/rational and institutional action. Management and IS methodically calculated plans and activities are facilitated or restricted by social, cultural, or cognitive forces, both within and beyond the boundaries of organisations.

A case study of organisational technology transfer.

To demonstrate the significance of these principles of contextualist analysis, in this section I trace the story of an effort of industrial reform in the island economy of Cyprus, examining in particular the role attributed to ICT in the re-organisation process. The details of this case study, which was conducted on the period 1993-1996, are described in (Chrysohos 1999). In this paper I draw extensively from that source. In addition I use primary data that I collected through 6 semi-structured interviews with 3 SME owners, one consortium manager and two government officials involved in the flexible specialisation initiative on Cyprus.

I first became interested in this case in the early 1990s, expecting it to elucidate the 'enabling' role of information systems in organisational change. The IS literature of that time emphasised that IS innovation acquires a strategic role in sectors undergoing organisational reform. A much quoted example was the extensive and innovative use of IT in banks after deregulation of the financial sector. Also at that time the business process re-engineering literature put forward a strong message about the capacity of IT to support organisational reform.

The industrial re-organisation effort that Cyprus had embarked upon involved many of the characteristics which in the IS literature were associated with the kind of context where ICT acquires a strategic role. It is a case of emulation of the industrial model of flexible specialisation which attracted a great deal of attention since the early 1980s as a way of organising production suitable for the changing market context of advanced industrial societies. However, with the first close investigation of this case it became clear that it did

not corroborate the widely held view of the enabling capacity assumed by IT on occasions of reform. On the contrary, the organisation reforms in Cyprus did not involve substantial ICT innovation. The following description and analysis of the story of the flexible specialisation experience of Cyprus attempts to explain this unexpected finding.

Background of the case

In 1987 the Government of Cyprus sought the services of the United Nations agency UNDP/UNIDO to develop an effective industrial strategy. The international consultancy team found that the country's labour intensive industry was geared towards mass production, and wouldn't be competitive in international markets. With a large number of small firms in a secluded economy and without prior success in exports, mass production was judged to be an inappropriate strategy. Of the 6,616 manufacturing firms of the country, 6,184 had less than 20 employees, and only 56 companies employed more than 100 people (Industrial Statistics of Cyprus, 1986). The majority of business firms were family owned and followed a craft tradition. It was estimated that about 13% of total wages and salaries were paid to working proprietors, their partners and family members. The consultants suggested to restructure the economy on the principles of flexible specialisation, judged to be particularly suitable for the social conditions of the island.

The theory

Flexible specialisation is one of the best known models of the organisation of production. It was proposed in the 1980s as an alternative to the Fordist method of mass production, more suitable for the changing pattern of consumer demand. Fordism - characterised by hierarchically managed organisations, using specialised technologies to produce efficiently for mass markets - has been the dominant model for the organisation of production in all advanced Western economies since the turn of the twentieth century. However, growing uncertainty of mass demand in the 1970s raised questions about the merits of Fordism. Flexible specialisation, emerged as an alternative viable industrial strategy that re-instates craft production to supply for diverse consumer tastes (Piore and Sabel 1984). But the craft-based business units suitable for the contemporary volatile markets are not just independent small producers. Flexible specialisation consists of networks of task-specialist organisations, or organisation units, equipped with skilled labour and flexible technologies. It is suggested that such a network is capable to produce changing volumes of quality goods for volatile markets without loss of productivity due to under-utilised workforce or machinery. Thus, in

general, flexible specialisation is associated with the following features: production driven by economies of scope rather than economies of scale; flexible machinery; niche markets; information intensive production inputs; task integration and flexibility; network and informal, rather than hierarchical, management structures; close customer and supplier linkage; competition by innovation, rather than by capacity.

The principles of flexible specialisation have been demonstrated with several different examples in various countries. Invariably such cases exhibit close cooperation among geographically concentrated firms, involving usually small or medium size enterprises. Significant factors for the success of flexible specialisation are considered to be a high degree of trust between employees and skilled workers, the provision of collective services through self-help, and often government mediated organisations (Piore and Sabel 1984; Pyke, Becattini et al. 1990; Cooke and Morgan 1994).

One of the best known cases often referred as a successful example of the model of flexible specialisation is the industrial networks of small producers and service providing agencies in the region of Emilia Romagna in Italy, and it was this particular case that Cyprus attempted to emulate. The area of Emilia Romagna, extending from the Apennines to the Adriatic has 50 industrial districts, each with a population of less than 100,000, and with a predominance of small firms, specialising in a particular sector. The firms in each district have formed networks of industry associations, co-operative consortia, and joint facilities. The consortia play a significant management role for their constituent firms, coordinating their production and serving them with access to external information sources, export promotion programmes, market research, and staff training. This allows the small firms to further specialise, some producing particular parts, others assembling, while they are able to share out production to others if demand exceeds capacity. Moreover, through the consortia the artisans of the small firms have access to complex and expensive technologies such as art machinery, and CAD (Trigilia, 1992).

The small firms participating in the consortia continue to be managed internally in a rather informal manner, but they had to move towards formalisation of particular functions, such as sales and marketing which are mediated by the services of the consortia.

Analysts of the development of flexible specialisation in Third Italy tend to emphasise the significance of the socio-cultural environment that fostered such collaborative industrial relationships that amount to collective entrepreneurship. A catholic tradition combined with

the prevalence of collectivist socialist ideology forms a socio-economic fabric that mixes traditional and modern elements. Such a culture facilitated the development of collaboration without the need of direct government intervention.

The organisational complexity of the industrial network of flexible specialisation in Emilia Romagna is sustained by rich information flows, both formal and informal. While management information requirements of the specialised SME producer firms are modest, the consortia and the network of support organisations need sophisticated systems to deliver multiple services to their diverse customers.

For example, a crucial role in the collaborative business of the region is played by the information centre ASTER, which provides on line search facilities to about 4000 firms and consortia through connections with over 1000 international information services. It disseminates data related to location, financial performance, products and activities of 55,000 manufacturing firms of the region. Another system maintains information on research and technology transfer facilities in the region, and allows interested firms to identify partners for collaborative projects.

Moreover ASTER develops and conducts test studies for new technologies, such as the development of intranet for exchange of information among SMEs, and a pilot study aiming to assess the socio-economic issues of EDI use by the SMEs of the region. Also, it acts as an information systems centre, providing services of requirements analysis for innovative IT uses, such as teleworking, and technical assistance for industrial automation, and new process technologies. In short, ASTER acts as an information broker both to the industrial actors of the region, and to their potential customers.

The adopted strategy

Taking the industrial experience of the region of Emilia Romagna as a model, the UNDP/UNIDO consultants to the Cypriot government recommended a strategy of economic restructuring that involved action at three levels: the small producer firms (SMEs), sector-wide, and national.

The most substantial structural recommendation concerned the formation of cooperative entities of small firms in a number of industrial sectors. Cooperative networking was suggested as a suitable organisational form for functions such as finance, production, marketing, research, and training that individual firms were too small to carry out effectively. Specifically, the UNDP/UNIDO team suggested that the small manufacturing companies

would benefit from the formation of consortia to carry out such collective services for themselves.

Further developments regarding finance, design, training and human resources were suggested for the national level. The strategy required an industrial banking system capable of taking a long-term development view. To that end, the country's Development Bank was advised to play a central role in promoting industrial restructuring by becoming a front line consultancy agency providing firms with support to re-orient their activities along the flexible specialisation lines.

Finally, the UNDP/UNIDO study, reflecting the significance attributed to geographic concentration in flexible specialisation, advised local and government authorities to plan for district industrial estates which would provide common facilities and services to specific industries.

Beyond the structural aspects of this industrial intervention, the social and cultural characteristics in Cyprus were expected to play a significant role in the success of the flexible specialisation experiment. The island's craft tradition, high percentage of educated population, strong presence of trade unions which had historically trusted the government and supported its policies, strong family and local ties were considered promising factors for the success of a flexible specialisation strategy.

However such a strategy required a substantial change in the relationship between industry and government. Government was to assume a facilitating role, particularly for setting up the national level institutions outlined above, but it had to abolish its protectionist policies. Reciprocally, business owners and work force were required to appreciate the need for the recommended restructuring and adopt the necessary initiatives in a creative way. In essence, the strategy amounted to re-orientation of attitudes, practices, and work and business values of a large network of people and organisations; in short a substantial institutional change.

Implementation of the flexible specialisation strategy

The adoption of the flexible specialisation strategy implied action for extensive organisational reform. Individual firms ought to consider their competitive position in the local and international market and adjust their production and business operations to become part of the industrial networks. New organisational entities – the consortia - with functions complementing and rationalising the performance of their individual firm members, had to be

created. Specialised service providers had to be established to support both the producer firms and their consortia.

A number of such initiatives were taken with varying degrees of success. The most visible area of activities was in the formation of consortia. Much less was done for the development of service providers, while rather minor changes took place within the small firms as a result of the strategy.

The consortia

The consortia developed in the furniture manufacturing sector are indicative of the kind of inter-organisational collaboration triggered by the flexible specialisation initiative. The first consortium created in the furniture manufacturing sector under the flexible specialisation initiative was AtoZ. It was founded in 1987 by 12 furniture making firms based in Limassol. These firms varied in size from 15 to 40 employees. The purpose of the consortium was to promote common marketing for the 12 shareholder SMEs. It built its central office at industrial district of its SME member, and began operations by creating showrooms in all major cities in the island.

AtoZ began operations with an informal manual system to transfer customer orders from the showrooms to the manufacturing firms production lines. When an order was placed by a customer a standard form was filled and the details were communicated to the specialised producer, mainly by telephone. A number of problems were experienced, such as incomplete information and misunderstandings in communicating order details, which in turn caused delays in meeting delivery dates.

To overcome such problems the executive committee of the consortium decided to computerise order processing. Technically and operationally, the computer based information system developed for this task was relatively simple. A database was installed at the headquarters of the consortium. Order details are transferred to the headquarters, entered in the database and consequently distributed to the producers. The system produces information lists on orders, delivery dates, customers, and selling prices, and is generally considered to have resulted in a positive efficiency impact. This system started later to be used to implement a penalty system for late deliveries.

Encouraged by this positive experience, the executive director developed plans for two further technology projects: a network to connect the showrooms with the consortium headquarters, and a design system through which the manufacturers would be able to propose

models and then display them at the showrooms of the consortium to monitor customers' response. However these ideas did not find a great deal of support by the shareholder SME firms and have not been implemented.

Another consortium, Line-11, comprising 11 small furniture manufacturers in the industrial district of Larnaca was established in 1991. It is intended to serve the same purpose as AtoZ, to market the products of its shareholder members under a common trademark, and its operations and management are very similar to those of AtoZ. Indeed its first executive director was a former director of AtoZ.

However Line-11 continues to rely on largely informal communications for the dispatching of customer order details. Telephone and fax are seen as perfectly adequate by its shareholders, and by 1997, at the time latest interview held with its director, there were no computerisation plans.

Substantially different from the two consortia outlined above is MFC, a consortium established in 1994 with the aim to achieve efficiency in one particular specialised process of furniture making, panelling cutting, through utilisation of computer controlled production machinery. MFC involves 4 furniture manufacturers of approximately the same size, 40-50 employees. The initial idea was to equip the consortium by pulling together existing machines and technical staff of its members. However, a number of problems emerged when the implementation of such a strategy was thought out. Existing machines were found to be obsolete, with limited capacity and capability, and incompatible with each other. Moreover, it was not easy to release employees from other duties in their firms and transfer them to the new organisation. It was decided to set up MFC by purchasing new computer controlled production machines, and by transferring only a few employees from the shareholder firms.

The work of panelling cutting at MFC is carried out by nine workers trained to operate the computer controlled machines, and supervised by a director with the support of a secretary. Strategic management is the responsibility of a board committee comprising the owners/managers of the member firms and the director.

Initially, the goal set was to achieve 60% utilisation of the capacity of the computer controlled machines' optimal capacity within three years of operation. That target was met within the first six months, covering all the production needs of the four members of the consortium and allowing surplus capacity that could be used by taking orders from non-member firms.

Despite the success in achieving the initial goal of the consortium there are obvious inefficiencies in the use of the computer controlled production technology. Details on panelling cutting are received on manual forms which include designs of the ordered products. Such order details are first typed on the machine, as input to an optimisation algorithm that calculates the size of the panels to be used in order to minimise waste of raw materials. Subsequently, and according to the production schedule, the output of the optimisation application and relevant programs are typed into the production machines. The production process involves several steps and different machines. Data and software commands are reloaded at each step with frequent mistakes and significant delays. At the time of the study the consortium had no plans to integrate the operations of the optimisation algorithm and the production machines.

Information services

One intermediary service provider set up at the national level, of particular relevance to this case study, is the Institute of Technology (IOT). It was established in 1992 as an agency of the ministry of Commerce and Industry with the mandate to support the technological upgrading of the manufacturing industry, and to create new technology industrial units. Among the aims of the IOT was to establish an information technology centre, and to provide consultancy services on technology and industrial development.

The information centre of the IOT was intended to provide information on a wide range of areas, such as market research, trading, abstracts of research relevant to various industries, industrial policy and regulations of the European Union, statistics, academic and professional journals, programs on human resources development. In 1996 IOT assumed also responsibility for administering a government plan, partly funded by the World Bank, of subsidising consultancy services on IT.

However, the impact of the IOT information and consultancy services is still to be felt. The small firms and the consortia of the furniture industry have not made any substantial use of these resources.

The producer firms

The small production outlets continue to be the most significant agents of the industrial network of flexible specialisation. They were expected to adjust their operations and develop their organisational capacity taking part in the wider network of agencies that complement or support their business. For example, the firms taking part in the AtoZ and Line-11 consortia

were intended to remain independent organisations, but they were advised to specialise by product, such as children's furniture, garden furniture, pinewood furniture, or office furniture. The firms that formed the MFC consortium agreed to allocate all panelling cutting to their consortium.

Initially the producer firms appeared to take advantage of the new opportunities offered by the various intermediary organisations set up by the government. For example several firms made use of the new financial schemes of the Development Bank to expand their business, and sought to upgrade the skills of their workforce through government sponsored training programs.

They were particularly appreciative of the opportunities to enhance their production technology. Thus the MFC consortium was created by the initiative of the owner of one firm and has continued to enjoy the commitment of its member firms.

There has been much less appreciation of and commitment to rationalising business strategy. In just two years after the creation of the AtoZ and Line-11 consortia their members started acting antagonistically both to each other as well as to the consortia that were supposed to be their marketing and sales agencies. Although initially the consortia boosted sales of the products of their members they could not absorb all their production capacity. The owners/managers of the small firms reverted to their pre-consortium state, each producing and selling on their own a broad range of products, rather than specialising by product. Each of them were competitors as well as suppliers of their consortium. Today, they often supply their products to the consortia at selling prices higher than those they offer directly to their customers. Thus AtoZ and Line-11 are now viewed as customers with whom producers have an agreement to supply a particular line of products with a pre-specified mechanism of pricing and delivery timing.

The industrial restructuring had little effect on the management of the small firms. Again, the most significant changes concern the rationalisation of production that resulted from the use of computer controlled machines. Producer firms had to standardise their product parts in order to be able to use the efficient new machines. In turn, such standardisation benefited the MFC consortium as an independent business organisation, increasing the efficiency of its operations, reducing errors in orders, and releasing spare machine capacity of further business.

However the structure, management, and business culture of the small firms remain unchanged, mitigating rather than contributing to the industrial change initiative. The owner/manager of the firm retains total control of the business through communications and task allocation. Unlike the traditions of Emilia Romagna, there is no cooperative culture to foster trust relationships among the entrepreneurs who strive for the growth of their family business.

Another aspect that remained unchanged is the perceived role of government institutions as protectors of the survival of local business concerns and providers of supporting services. Nurtured in the protectionist regime of the post-war boom in the 1970s and 1980s, the owners of the small firms did not manage to develop an export orientation and have not developed a competitive attitude appreciative of market information services.

Under such conditions the information systems requirements of the producer firms remain very limited. Computers are extensively used for administrative tasks, but the potential of IT to support decision making remains irrelevant in an environment of informal management. As the inter-organisational links that the flexible specialisation strategy intended to establish have remained very limited no need for network communications has arisen. Moreover, lack of export orientation makes international information communications irrelevant.

Discussion

The industrial restructuring initiative in Cyprus did not have the impressive results observed in the region of Emilia Romagna it sought to emulate. The limited networks of producers and service providers that emerged after the adoption of the flexible specialisation model in the 1980s did not develop the expected capacity to compete beyond the shores of the island. ICT clearly did not assume a strategic enabling role, and continues to be a weak actor in the networks of the furniture manufacturing sector.

Therefore, the question this case study raises is why IS development did not acquire high significance within the implementation of the re-organisation strategy of the flexible specialisation in Cyprus. The discrepancy of the case from the generally expected enabling role of ICT could be examined in various ways, each contributing particular perspectives of the situation. A static analysis of factors and actions significant for effective IS innovation would point out several omissions: none of the organisations studied had an IS strategy; no business process redesign was undertaken to exploit the potential of IT for organisational reform; there were no ‘champions’ for IT innovation. An analysis of the ‘fit’ of technology to

the organisational context would elaborate on the limited information requirements and the poor technology skills of the SMEs and their consortia. A static contingency analysis of the options available to the SMEs within their competitive environment would perhaps show that the managers of the SMEs did not address themselves to the opportunities opened within the new structure of flexible specialisation.

While each of these perspectives contributes valid observations, they do not explain ***why*** IS innovation did not acquire a significant role, and therefore have limited value for the effort to understand what interventions are needed to introduce effective change. Indeed, such observations, if not accompanied by adequate understanding of the processes responsible for them, may lead to wrong interventions. For example, one could advise SMEs to draw an IS strategy aligned to their business objectives, or apply BPR, actions completely futile within their context.

The contextualist approach suggested in this paper provides a way to gain insights of the processes that explain the role attributed to IS innovation. Following the first contextualist principle - that IS innovation is inseparable from the endeavours of organisational change - the reasons why IS innovation has been so limited should be traced by examining why organisational re-structuring has been limited in the first place. And according to the second and third principles, a process of socio-technical change should be studied by considering the combination of technical/rational actions and institutional forces at three different levels of context: international, national, and organisational. An analysis along these principles reveals the following influences on the organisational change process:

a) Technical/rational ideas and action at the international level. A prominent technical influence in this case is the flexible specialisation theory and its adoption by international aid agencies. It can be argued that the limited use of ICT is due to the limitations of the flexible specialisation model, which did not include a convincing strategy for the mobilisation of ICT for management purposes. The socio-economic theory of flexible specialisation does not elaborate on organisational processes, management and information systems. It is concerned with the macro system of production and consumption and with relationships between macro-institutional entities such as labour, government agencies, efficient production and distribution chains, and market demand. Technology does feature within the list of factors considered significant for a flexible specialisation, but this refers almost exclusively to production technology. Thus the initial analysis of what changes were required, did not direct attention to information

systems, information resources for management, and information based decision making. The traditional informal type of managing family owned business firms was left intact. Even less effort was made to introduce management appropriate for the more complex entities that the new industrial model was aiming to develop.

b) Institutional influences at the international level. All three types of coercive, mimetic, and normative forces played a role in the initial decision to adopt the flexible specialisation strategy. The government of the country was facing international pressure to restructure its economy, and abolish protection policies. Professional 'economic planners' were involved to design a new economic structure, thus introducing prevalent international socio-economic ideas. Finally, there was a strong element of organising vision, as the 'image' of Third Italy - a region that succeeded to preserve traditional values and, at the same time, to achieve affluence within the modern global economy – appealed to the government and the local industrialists.

c) Technical/rational initiatives at the national level. There has been a clear government policy making and planning intervention in this case. Flexible specialisation was adopted officially as the government policy to develop an export oriented manufacturing sector. The wisdom of such a policy is questionable, and indeed towards the end of the 1990s government economic policy shifted emphasis to services, relaxing the significance attributing to manufacturing for the country's economic development. However in the meantime there have been a number of government initiatives as part of the implementation of the flexible specialisation strategy, including relevant legislation, financial services, and the establishment of the Institute of Technology. These initiatives offered an extensive range of support for the reform process.

d) Institutional influences at the national level. Perhaps the most significant institutional aspect that sustained the choice of the flexible specialisation strategy is the 'organising vision' of a small island economy claiming a place in the 'club' of industrialised countries. To that end, the re-organisation of the small manufacturing firms was accepted as a desirable process. But, another strong institutional aspect that acted as an impediment to such a 'vision' is the traditional relationship between government and industry, and the parochial attitude of the local industrialists. The small manufacturers were not able to transform from government protected local entrepreneurs to export oriented global market actors.

e) Technical/rational action at the organisational level. A number of technical aspects associated with the re-organisation efforts and IS innovation are found in the history of this case. There have been planned and formally executed restructuring initiatives, including the formation of consortia, some efforts for employees retraining, some redesign of business processes. However, particularly noticeable is the limited capacity of formal professional management in the SMEs, which to some extent explains why the strategic value of ICT based information systems has not been exploited. Lack of formal management capacity in SME companies has been shown to be an impediment to the use of computer based information systems in several other countries too (Lind 2000; Volkow 2000).

f) Institutional aspects at the organisational level. The new industrial organisation was not in harmony to the underlying values of the traditional way of running the small manufacturing firms, and the managerial order implied in the development of export oriented industrial networks clashed with the entrepreneurial rationality of the SME owners. Unlike the initial idea of local collaboration within traditional communities, the Cypriot traditional family and business ownership values created mis-trust to the partnership schemes involved in the flexible specialisation. SME owners were reluctant to relinquish power on the running of their business to professional managers, and no complex heterogeneous networks that require the management of inter-dependencies, were developed. Consequently, the information requirements of the small informally managed firms did not provide a need for sophisticated technology-based information systems.

Conclusions

The argument put forward in this paper is that in order to understand the realistic potential of ICT innovation we should study the way such innovation is related with processes of socio-organisational change. Moreover, IS studies should go beyond the technical/rational actions of professional experts and managers, and should consider the institutional forces - both within an organisation and its environment - that necessitate or legitimate such actions. The explanatory capacity of these arguments were demonstrating by examining the reasons for the limited IS innovation that took place in the case of the implementation of organisational reform in the manufacturing sector in Cyprus.

Such contextualist analysis is not only an appropriate approach for academic research aiming at explaining complex situations, failures, or successes of IS innovation. It is also a necessary competence for professional practice. If, as it is now widely recognised, ICT innovation does not deterministically lead to desirable effects of economic performance and social change, there is a crucial need to develop professional capacity to facilitate the exploitation of technological potential in relation to the socio-organisational processes of change within which innovation is embedded.

Such analysis is particularly relevant for countries which pursue ICT based development planning under the perceived imperatives of the global economy and by emulating other regions' successful techno-economic policies. For example, during the 1990s there has been a widespread adoption of 'information society' policies throughout the world. In most such cases IS experts limit their role in assisting with the implementation of the technology innovations. At best they try to 'fit' the technology to the local organisational characteristics. Nevertheless, within a changing socio-organisational environment such a 'fit' defies the policy objectives new technology is expected to serve, since the desirable objective is change. IS professionals must be able to judge the potential, develop and manage information systems in a changing context. To do so they need to develop the capacity to take into account the processes of change across layers of context, and to judge the forces that contribute to the realisation or impede initial plans in order to pursue feasible action.

At present, though, such an analysis is beyond the capacity of IS professionals. Most of the knowledge developed and taught in the IS field promotes a normative professional practice, based on a limited perception of context. Broader organisational processes are usually outside the perceived terms of reference of IS practice. Further research is needed to develop appropriate analytical knowledge to equip professionals with capabilities to pursue contextualist analyses. Such knowledge is likely to be more judgmental than method driven, more analytical than normative, and oriented towards advising rather than deciding and doing. The argument that IS innovation is inseparable from social processes unfolding through layers of context partly by technical rational calculations and partly under the influence of institutional forces poses a challenge to redefine the role and knowledge of IS professionals.

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