

Learning Capabilities and Organisational Learning – the strategic role of information systems in the knowledge economy

Angela Lacerda Nobre
Escola Superior de Ciências Empresariais do Instituto Politécnico de Setúbal
Portugal
alnobre@esce.ips.pt

Abstract

The present work aims at illustrating the role of information technology in general and of information systems in particular (Martin & Powell, 1992; Daniels, 1994; Mankin et al, 1996) in the process of organisational innovation. Two distinct frameworks are used, both being extensively based in information and communication technology and linking the human with the technical aspects of information systems: learning regions (Charles et al, 1999) and learning organisations (Pedler et al, 1989/91; Nadler et al, 1992; Senge, 1990/98/99; Askew et al, 1998; Hofstede, 1994).

Some learning theories are briefly described (Sherry, 1996; Seamans, 1990; Streibel, 1991; Savery & Duffy, 1995; Askew & Carnell, 1998) and the semiotics model of organisational morphology (Kecheng, Stamper and Huang, 1997) is presented as the theoretical foundation of this study.

The idea is to identify common patterns of behaviour and similar rationales for organisational innovation, when analysed from different perspectives, ranging from an individual and personal level, to teams, organisations, sectors and regions. At regional level, the higher degree of complexity considered, there are common aspects that link the learning organisation's ideals to the learning region concept.

The information era and the knowledge economy paradigm (Kearmally, 1999; Dowrick, 1995) are referred as taking an holistic and systemic approach that is, itself, the justification for the broad perspective taken in this particular study.

The interpretation of an organisation as an information system, that is characteristic of the semiotics framework (Stamper, 1985), stresses the need to avoid the technical bias of usual information systems analysis and design. The richness, ambiguity and complexity of human organisations must not be ignored and the referred morphology model presents a technique to evaluate both human and computational issues of information system design.

Finally, knowledge and knowledge management, as the new paradigms of today's society (Kearmally, 1999; Dowrick, 1995), is one way of explaining why the human aspects of information systems are so difficult to tackle.

Key words: organisational learning, organisational innovation, knowledge management, learning capabilities, agents and organisational semiotics

1 Learning organisations – the settings for the study

Learning organisations come as an approach, from the internal perspective of an organisation, to the challenges posed by the new paradigm of the knowledge economy. However, this internal perspective is better understood within a regional context – how may each organisation be affected by the conditions and capabilities offered at regional level. In this sense, the concept of

learning regions is a necessary complement to the process of analysis of organisational responses to the new paradigm.

A further aspect to be considered is that both learning regions (Charles et al, 1999) and learning organisations (Pedler et al, 1989/91; Nadler et al, 1992; Senge, 1990/98/99; Askew et al, 1998; Hofstede, 1994) concentrate and focus on the development of these «learning» capabilities – and the impact and contribution of information and communication technology. Both these areas, though recent in terms of research fields, already have aggregated extensive material.

The two areas use, as one of the main subjects and a critical working area, the information and communication technology, in particular the strategic role of information systems (Martin & Powell, 1992; Daniels, 1994; Mankin et al, 1996).

In an organisational context, well designed information systems enable organisations to stay competitive in a changing environment – guaranteeing that the factors of competitiveness evolve in the direction and at the right pace of the market's mutations. Learning organisations, a complex approach to organisational innovation that focus on people and technology in a way that breaks the functional pattern of traditional settings, understands the human and the computational aspects of information systems as a core area of the organisation's learning capacity.

Regions, as geographically defined areas that consist of more and less densely populated areas, namely towns and rural or industrial areas, have a certain level of economical and social development that is linked to many diverse factors – natural resources endowments, quality of infrastructures networks and accesses, qualification of human resources, cultural aspects of prevalent mentality, demographic characterisation and political aspects, just to mention a few. The learning region concept focus on a series of complex relations and interlined factors. Starting from the information era and knowledge society new paradigm (Kearmally, 1999; Dowrick, 1995), it considers the capacity of different sectors of activity and of individual firms to incorporate that - knowledge management - paradigm. Then, as an obvious step, it analysis the key attracting factors that enable regions to offer those critical activities – to be more precise, it analysis the decision making process that leads firms with specific characteristics to chose to be located in particular towns and in particular regions.

The learning region evaluates its current status, as far as the prevalent division and proportion of different sectors of activity is concerned – activities ranging from a less to a more intensive use of information and knowledge - and tries to influence those strategic factors that are critical to the referred (location) decision making process. The main characteristic of those activities is that they are high value based – as opposed to volume based services that use lower cost labour

– and they use international and highly qualified labour to provide knowledge intensive information services.

Accordingly, the critical factors of attraction for a learning region are, the capacity to build knowledge infrastructures, resources and competencies, the capacity to attract, through the provision of a high quality of life, highly mobile elite professionals and to bring in high value information services, such as tele-services or tele-banking.

As was referred at the beginning, information and communication technology and information systems are central to the analysis of both learning regions and learning organisations.

2 Organisational Innovation and information technology

What factors are critical, and in what way, to the process of organisational innovation?

Saying it in other words:

What are the pre-requisites for innovation at organisational level?

A common thread that may be explored is the role of information and communication technology, in general, and of information systems, in particular, from different perspectives of analysis.

These perspectives involve the analysis of pre-requisites - for innovation at organisational level - related to information technology and to information systems, from increasingly complex viewpoints:

- personal/individual
- team/process/project
- organisational
- sector of activity
- town/urban
- regional

The idea is to identify common features that can then be traced at any of these stages of analysis. These stages, or perspectives, have implicit an increasing degree of complexity, and the common traces they share may be interpreted as the critical areas and the pre-requisites for innovation at organisational level. Seen as a flow, from the organisation viewpoint, we may look inwards and identify critical issues at team and individual levels, or look outwards and analyse the context and environment with which the organisation interacts – namely, the sector of activity it belongs to, and the town and region where it is located.

From an umbrella view of a regional development perspective, the strategic role of information systems is analysed in order to identify in what way it may contribute to the degree of innovation at organisational level.

The knowledge society concept and the way the models of learning organisations and of learning regions are defined, all involve the notion of an holistic and of a systemic approach, in order to address the complexity of the real world situations these concepts describe. This is the justification for the cascade approach to organisational innovation that is tried out in this study proposal – from the individual, to the organisation and to the region.

3 Learning as an attitude

Within the context of a «knowledge economy» in an «information age», the concepts of knowledge management and of organisational learning represent two faces of the same coin. In order to grasp and to take profit from all the advantages posed by a knowledge based society, it is necessary to master the processes through which we may assume full citizenship in this new world. A key step in this process is the understanding and analysis of learning processes as such.

The theoretical basis on which learning models is based affects not only the way in which information is communicated, but also the way in which the learner makes sense and constructs new knowledge from the information which is presented (Sherry, 1996).

Until recently, the dominant view has been the traditional, information processing approach, based on the concept of a computer performing formal operations on symbols (Seamans, 1990). The alternative approach is based on constructivist principles, in which a learner actively constructs an internal representation of knowledge by interacting with the material to be learned. This is the basis for situated cognition (Streibel, 1991) and problem-based learning (Savery & Duffy, 1995).

According to this viewpoint, both social and physical interaction enter into both the definition of a problem and the construction of its solution. Neither the information to be learned, nor its symbolic description, is specified outside the process of inquiry and the conclusions that emerge from that process. This is a much more complex, interactive, and evolving approach.

When examining the identification of the roles played by students and teachers in an educational organisation, this approach interprets learners as being the workers in the educational enterprise, and not as customers. They have aspects of both, of course, but from this specific point of view, it is learners who have to work to create the change in themselves that is called learning. The process is facilitated, resourced, co-ordinated and monitored by teachers, but is undertaken by

learners. This concept is developed in the book «Transforming learning: individual and global change» (Askew & Carnell, 1998), and this approach is used by P. Senge (1999), where, in the context of a learning organisation, change can only be implemented when people, themselves, change. With no change processes from within, there is no organisational change. Also, this individual change is not an isolated process but is integrated in the organisational network, namely at the team level – they involve a personal commitment but it is a collective as well as an individual process.

This diversion into learning issues and theories is intended as an introduction to the right frame of mind in which to approach the organisational learning process that is the subject of the next section.

4 Human and technical information systems – the organisational semiotics model

The «organisational morphology model», applies the methodology and theories of organisational semiotics to the study of organisations. Through this approach, both human and computational parts of an information system are integrated (Kecheng, Stamper and Huang, 1997). This model takes a semiotic approach to organisations that are, themselves, defined and interpreted as an information system.

Two key elements are identified: agents and their actions. Agents act purposefully according to some pre-defined goals and their actions fall into three categories: substantive behaviour, governed by tasks, rules and norms that lead to the business goals of the organisation; communication behaviour, or message passing, that is concerned with signs and that is directed to support the first type of actions, and control behaviour, that covers the power of enforcement stipulated in rules and regulations.

This approach identifies organisations as norm-based and norm-governed systems composed of three subsystems: substantive, message passing and control. One of the important assumptions of this model and which is the attribute that makes this model so robust in organisational re-engineering settings, is that healthy organisations consume a very small proportion of resources in message-passing and control activities and direct and concentrate most resources to building up an organisational platform for substantive activities – those that are critical to the attainment of the organisational business objectives. An unhealthy organisation, with an heavy investment in the first two subsystems, may be characterised as a bureaucratic infrastructure that would benefit from a re-engineering process, where effectiveness of the organisation would be enhanced.

This model analysis an organisation through the specification of norms and «affordances», using NORMA (Stamper, 1985), a language that enables an analyst to study the behaviour of agents in an organisation. The roles of agents in an organisation can never be over emphasised as they construct much of the business world through their social and business practices.

This model is able to reach the precise information from which software engineers may design the mechanical, automated and computational part of the information system, and it also gives insights into the richness and complexity of the human side of information systems. Software engineering and its supporting theory of computation have nothing to say about meanings, or intentions behind the data being processed, nor about responsibilities, the social value of the information systems or justifications beyond their mechanical function. This broader approach that is possible through this model is a way of promoting, as architects of organisations, the task of facilitating the evolution of patterns of organisation that best suit the people involved and not to dictate the structures to be used – reflecting the needs of people rather than the demands of machines.

An important aspect of the semiotics morphology model of organisations is that it is quite general for all organisations in the same kind of business, so that it may be further developed to be applied in a larger scale to organisational re-engineering and information system development. The constant part of the model is its substantive area, which is generally stable for the whole business life cycle. On the other hand, message passing and control are actions that are closely related to the management style and that are likely to change over time when people, technology and other factors change. These areas are the target of organisational re-engineering. Organisational semiotics thus offers a robust model to the study of both the tangible and technical aspects of information systems and the intangible and human centred issues that are key to a better understanding of organisational learning processes. Knowledge management, innovation management and change management are key components of this highly symbolic and often implicit concept of organisational learning.

5 Final comments

The idea behind the citation «*think global, act local*», is present in the design of this study, namely, through the linking of different perspectives of analysis.

Another related concept (Dentinho, 2000) cites: «*think at eternity, act at the margin*». This citation confronts the dialectic tensions involved in planning with a long term framework, especially when environmental issues are concerned, to the need to set action criteria based in

the powerful tool of economics marginal analysis. It is at the margin that the optimal solutions are identified.

A further development, and over simplification, of these citations is just: «*think and act*». This may be a hidden objective, yet more profound, of this study. We cited the information era and the knowledge society, but we all live, recognise and suffer from non-knowledge situations, where organisations, as a whole, and individuals, *per se*, refuse, first to think – which implies to confront, to question, to reflect, to evaluate and to decide – and then, to act – to act according to the reasoning and decision made, and not solely following a pre-defined pattern. As is referred by a popular saying: «*There is no one more blind than someone who doesn't want to see.*»

The accelerating evolution of information technology was not followed by a similar evolution in terms of human knowledge and behaviour. These are conditioned by complex factors, related to cultural factors like the prevalent mentality, and to civilisational issues that have been present for centuries, if not millennia.

When referring the «knowledge society» does not mean that knowledge is certain, or even easily accessible, but rather that there has been a change in paradigm, where knowledge, and knowledge management, are the critical attributes and competencies.

As a fundamental concept for the new millennium, information systems must not be focused solely on the mechanical and technical parts of the system but must integrate an alternative perspective that acknowledges the intrinsic ambiguity and complexity of organisations, where power and politics make nonsense of any claim of objectiveness. Organisations are the real information systems, and the technical bias that is often present in information systems design failures is not related to technical inadequacy but to the fact that the system does not adequately serve the organisation.

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