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INSERTING ICT AND IS IN A COMPLEX ORGANISATIONAL ENVIRONMENT USING AN ORGANISATIONAL LEARNING MODEL

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Abstract

Within the last few years, knowledge management has become one of the hottest subjects among organisational and information systems theorists and practitioners. Many find in it an amazingly opportunity to bridge the two areas, so many times pursuing common goals following parallel, never matching paths. And they are so absorbed with the new hip that they are letting drop an indissociable concept, organisational learning (OL), with which everything begins.

The concept of OL is not new. However, there is an ongoing controversy around the field, as well as around its most recent reedition or pragmatic reconfiguration, the learning organisation. As a result, several models have been developed but, up to now, none seems to have been particularly acclaimed and accepted.

This work presents a model for the study of organisational learning, developed in order to fill the gaps found in the literature. Namely, it seems able to work as the integrative framework, providing the holistic context where to study, develop, use and evaluate organisational IS and ICT. It may also help to bridge the theoretical preoccupations and the more rigorous approaches found in the OL field and the empirical drive of the research done in the context of the learning organisation studies.

Keywords: organisational learning, information systems, information and communication technologies, model

1 INTRODUCTION

The concept of organisational learning is not recent. However, the interest for this thematic has grown remarkably in the last years (Crossan and Guatto, 1996).

Several reasons can be suggested for this new wave of awareness towards OL (Dodgson, 1993): the interest of large organisations, as they attempt to develop structures and systems more adaptable and responsive to change; the deep influence that fast technological changes are having in organisations, implying the need to learn to do things in new and sometimes radically different ways, and the dynamical and integrative character of learning, whose use emphasizes the constant mutation processed in organisations while allowing the unification of several levels of analysis.

However, as Easterby-Smith argues (1997), the new thread of literature contrasts with the traditional line in several aspects. While the literature in the area of the OL assumes the analytical tendency and concentrates on understanding the learning processes, without necessarily seeking to modify them, the new area is action oriented and has got, as its main goal, the creation of an ideal type of organisation, in which learning is maximized. However, the methodologies being used, the fact that the investigators often report the consequences of initiatives and changes in which they were particularly involved, the lack of historical perspective and the weak theoretical bases of many of the works lead to question the results of these studies and the prescribed remedies.

Organisational learning is a theme that has always generated a great controversy. Among the subjects that have been dividing the investigators, the issues directly related with the existence of the phenomenon and with its nature deserve a special mention. For some authors, OL does not exist nor can it exist, since only the individual can learn. What really exists is individual learning in organisational context (Simon, 1991). For others, any learning, even at the individual level, is a deeply social phenomenon. Taking another perspective, some investigators defend the centrality of the concepts of information and knowledge in the learning process. For them, learning involves the acquisition, interpretation, distribution and storage of information and knowledge (e.g., Huber, 1991). Others argue that the cognitive/computational perspective is not important in the study of OL, since this results from the communication and interaction among people and nor the communication or the interaction has got a computational nature (e.g., Durand et al., 1996).

As a result of the controversy around the subject, several models have been developed for the phenomenon but, up to now, none seems to have been particularly acclaimed and accepted (Strauss, 1995, Crossan et al., 1999). Three great flaws are pointed to most of the studies in this area: not providing an integrated and deep understanding about the way how the external environment and certain factors internal to the organisation may impact on OL; missing to establish a clearer and a stronger association between IS, new ICT and OL and forgetting, in a systematic way, the reality of a significant part of the world's companies, namely, Small and Medium Enterprises (SME).

That's perhaps why we have assisted to a new fading of such a difficult concept as OL is and to the emergence of a new hip, the learning organisation, itself not exempt of criticisms.

The main goal of this work is to present a model for the study of organisational learning. First, we present and discuss some of the models that can be found in the literature. Then, we present and discuss a new model, developed in order to fill the identified gaps. We expect it may help to bridge the theoretical preoccupations and the more rigorous approaches found in the OL field and the empirical drive of the research done in the context of the learning organisation studies. Moreover, it seems able to work as the integrative framework, providing the holistic context where to study, develop, use and evaluate organisational IS and ICT.

2 MODELS OF ORGANISATIONAL LEARNING

The divergences and antagonisms, in what it concerns to this problematic, are foreseen in the diversity of definitions of OL that can be found in the literature. The learning concept can be understood and presented in different ways, so the problem starts with the possibility of finding a common definition for the term. To define learning as the acquisition of knowledge or capacities, for example, is to lend to the concept two meanings, to know why and to know how, that is, conceptual learning and operational learning (Kim, 1993).

The multiple origins and diverse centres of interest of the specialists studying this matter are, without a doubt, two of the main reasons for the appearance of the several models. We present here some examples, as representatives of some currents and investigation lines and because, somehow, they informed the development of the model we are proposing. An independent and disinterested analysis, ignoring the attraction exercised by the different specialties and disciplinary threads, will verify that no model can be considered complete, since each one of them ends by focusing aspects underdeveloped in others, but which are not completely absent there or/and explicitly referring to aspects that are implicit in other models or/and keeping in the shade aspects that are explicitly approached and discussed somewhere else.

We begin with two of the more referred authors, among those who are devoted to the theme of the learning organisation. The authors that deal with this thematic usually present works with an eminently empirical character, replete of practical examples, picked up in the organisations they have analysed and where some of the studied characteristics are introduced as the reasons of its excellence, due to the way as they allow those companies to learn. These studies have been criticized by the exiguity of appropriated theoretical foundations (Easterby-Smith, 1997, Tsang, 1997).

According to Garvin (1993), the learning organisation is especially skilled in five activities: systematic resolution of problems, experimentation, learning from past experience, learning from others and fast and efficient transfer of knowledge to the entire organisation.

Senge (1990) refers to five disciplines that, when developed together, may have a significant and measurable impact in the performance: systems thinking, personal mastery, mental models, shared vision and team learning. These five tools are supposedly able to place and maintain the organisation in a state of continuous learning, but the author seldom refers, explicitly, to the ways each one of them contributes to the process. Another criticism that may be done to this work is its almost exclusive focus on the leader/manager or, at least, on the management team.

Nor Senge (1990) or Garvin (1993) get to present a formal model for OL.

March & Olsen (1976) discriminate between individual and organisational action. The individual actions are based on individual believes and lead to organisational actions, which will produce an environmental response. The cycle is completed when the environmental response affects the individual believes. If the environment stays static, individual believes and actions won't modify the same happening with organisational actions. However, in the presence of environmental changes, individual believes concerning the nature of the environment may change, precipitating a group of individual and organisational actions and provoking a new learning cycle. The model allows approaching the subject of the incomplete learning cycles, when the learning in face of environmental change comes out harmed, due to the weakening or the break of one of the connections. However, it also ignores, considerably, the interactions between individual and organisational learning. The first is primarily triggered by the environmental responses and the second happens when the cycle is completed, implying that OL depends on what happens in the exterior, what doesn't contemplate nor explains the learning that happens in the interior, independently of the external environment.

Daft & Weik (1984) consider that the overall learning process involves three phases: scanning, interpretation and learning. Besides the less orthodox practice of attributing the same name to the total

process and to one of its phases, these authors also end by associating the interpretation of information to a restricted group inside the organisation, the managers in the top of the hierarchy, and gluing to the behavioural perspective, taking “learning” as “acting”, in the phase of the process where visible results appear. Just as it is presented, the model ignores, significantly, the interactions between individual and organisational learning and it seems to suggest that interpretation and learning are unlinked activities, both in time and space, practiced by different actors, what could take to conclude that those who interpret do not learn and those who learn do not interpret.

Nevis et al. (1995) present a model for the organisational learning process based on three phases, knowledge acquisition, sharing and utilization, but that do not explicit the way individual knowledge is transferred to the organisation. The model used to describe the organisations as learning systems has the merit of remembering that the process can be influenced by certain organisational factors. However, the group of orientations and facilitating factors risks becoming one more checklist, which difficultly can embrace all the aspects that influence OL.

According to Huber (1991), four sub-processes contribute to OL: knowledge acquisition, information interpretation, information distribution and organisational memory. The author do not make clear what are the relationships among the sub-processes, but he enumerates activities, events or situations that can benefit or harm them and points out numerous theoretical and empirical studies that, somehow, contribute to the state of the art in this area. Huber (1991) embraces a construction for OL supported by the processing of information and knowledge. By “processing” one must not understand any kind of computation, similar to those that allow a computer to transform incoming data into output reports. The approach is much more complex than what a simplistic and superficial reading can make to believe, with the author dealing with practically all the aspects that appear in the remaining models. Besides identifying the learning sub-systems and stressing the role of information and knowledge, he points to several factors that may influence the organisation capacity to learn and focus, explicitly, the role of individual and shared mental models in the process. However, he does not refer the mechanisms involved in the transference.

Schwandt (1996) presents a model composed by four blocks with functions similar to the sub-processes described by Huber (1991). However, Schwandt (1996) approach makes clear their mutual interdependences and the way they change information with each other, while Huber (1991), perhaps because he doesn't present an illustrative diagram of the process, deal with these aspects during the subsequent theoretical explanation. On the other hand, introducing the concept of system, Schwandt (1996) eclipses the people and the organisation. In the aseptic atmosphere that remains the problem of knowledge transference from the individual to the collective becomes imperceptible. The suggested checklist, illustrative of the way as the interaction media can take a more concrete and measurable aspect, supplies a group of variables that, on one side, can reveal the capacity of the organisation to learn and, on the other, can be used to foresee that capacity and identify fragility areas.

According to Kim (1993), the core question it's the way as the learning done by each member is transferred to the collective. The author keep himself apart, ostensibly, from the theories based on the processing of information and knowledge, using concepts as learning, thinking, understanding, mental models, interaction, know-how and know-why frequently, but rarely the word knowledge and, even less, information. The mental models are seen as managers and referees of the acquisition, retention, use and drop out of information and, more than that, as possessing the capacity for redefining the rules used in the process (know-how) and to choose from among several alternatives (know-why). However, the structure and the presentation of the model turn difficult to those studying it to lay aside of the need of considering concepts as information and knowledge, at least because some of the verbs and used concepts imply its existence. Taking the criticism to the end, one can even argue that Kim (1993) doesn't get to explain the way as the individual learning is transferred to the collective, once, avoiding speaking of information and knowledge, he misses important mechanisms as the communication between people. On the other hand, although not explicit in the model, Kim (1993) considers the hypothesis of several organisational factors affecting OL, by weakening or cutting one or

several of the existent connections. Less biased investigators would not have difficulty in discerning, embedded in the model, the four constructions proposed by Huber (1991).

3 A MODEL THAT LINKS ORGANISATIONAL LEARNING AND ICT

Given its content and empirical drive, the work of Nevis et al. (1995) and of other authors (e.g. Garvin, 1993) can almost be understood as answers to the need identified by Huber (1991) for researching aiming at finding effective means of increasing the efficiency of OL. However, this kind of approach, in form of checklist, may end demonstrating as ineffective as most of the programs of enterprise development that have been sprouting in the last years. The implementation of some of its points in a led astray way, whether failing by lacking of support in undeveloped areas or because it collides in a frontal way with other realities only contributes to the increasing of dysfunctions in companies. On the other hand, if its implementation has to be obligatorily translated in terms of personal, strategical, structural or even cultural changes, two questions are immediately lift: 1) to change or readjust a given orientation or factor (Nevis et al. (1995) model), which are the alterations that are necessary to perform in the organisation (people, culture, structure, leadership, ...) or in the strategy it is following? 2) if that transcription shows necessary why not to begin the analysis of the organisation and of the learning processes taking place in there precisely by these aspects?

Fiol & Lyles (1985) defend that the culture, the strategy and the structure of an organisation, besides its external environment, may influence OL. The authors emphasize that this influence is one of the few subjects in that the investigators seem to agree. They also refer that the relationship is circular, since these factors creates and reinforce learning but are also created by it.

Related with these aspects, two different perspectives can be found in the literature (Crossan et al., 1995). The one more easily accepted admits that some organisational variables affect the learning done by the individuals. The other, more controversial, defends that learning can, somehow, be stored in the systems, structures and procedures of the organisations (e.g. Walsh & Ungson, 1991). However, a great part of the studies doesn't get deeper in the way those variables may affect OL nor in the way as they can, themselves, be affected by that learning.

On the other hand, "organisational learning cannot be created and eradicated by varying the external stimuli" (Dodgson, 1993, 387) in spite of the many voices arguing that, as the environmental uncertainty grows, so it grows the need to learn. OL is stimulated both by external changes and internal factors, in an interactive and complex way and its results are rebounded in the environment.

And one has to take also in consideration the theories that advocate that the organisations can and should assume a more proactive role, consciously influencing the environment that surrounds them and innovative positions that defend that the external environment is a product of the collective creation of the members of the organisation (Weik, 1995). But it also tails it to its measure, when choosing its competitors and partners, positioning its products and educating its customers and workers.

The growing awareness to this problematic took to the development of a theoretical model integrating the factors pointed in the literature and others that were considered pertinent, in face of the analysed works. A deep literary revision detected different kinds of works with interest to this study.

Some researchers explicitly refer the way as certain factors can mediate OL, as it is the case of Fiol & Lyles (1985). However, the treatment given to the subject lifted some problems. First, because they are based on suppositions rarely or never tested empirically. Second, because they don't analyse that influence at the level of the learning processes, namely, ignoring the sub-processes of information and knowledge management.

Therefore, there was a need to examine works explicitly researching the way as certain organisational factors may affect the acquisition, interpretation, dissemination and accumulation of information and

knowledge in the organisation. However, most of the times, these studies do not refer to OL in an explicit way.

On the other hand, the studies, namely empirical researches, that investigate the direct role these factors may carry out in OL, due to its capacities to change, somehow, the flow of information and knowledge, or indirectly, given the influence they exercise in the other factors, namely, in the process of ICT adoption, are very rare. Rare are also the empirical investigations that explore the impact of these technologies on organisational factors.

The theoretical model developed for the study of organisational learning (Figure 1) emphasizes the influence of the external environment and of internal factors in the learning processes, shows the way they can mediate them and points out its function as repositories of the learning done by the organisation, aspects that are considered underdeveloped in most of the analysed models.

Organisational learning is faced as a social process of interactions among individuals that, although not always in a conscious or intentional way, results in the creation of knowledge.

This positioning does not relegate to a second plan the learning done by each member of the organisation. The existence of shared mental models it is seen as being dependent on the existence of individual learning processes, that are done in function of a competence and that postulate an heuristic path of active understanding and an imaginative judgment. That learning shows up through the exercise of a capacity to learn, at the same time, innate and acquired and it is developed, enriched and organized more correctly through the social interaction and the complementarities of the cognitive styles (Ingham, 1994).

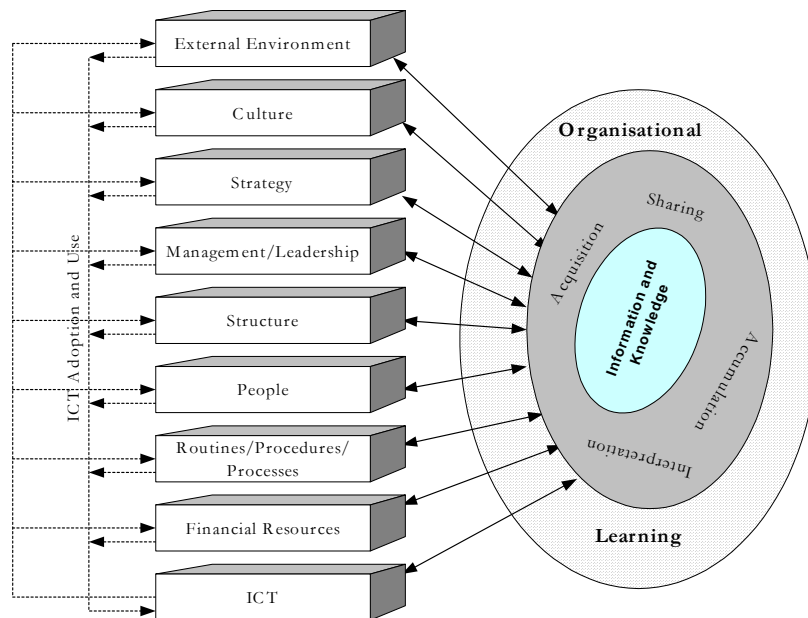


Figure 1. Organisational learning and ICT: a model.

In spite of not being always conscious or intentional, OL is usually developed inside of a consensus concerning the domains where the knowledge may be or have to be produced. That consensus is favoured by the shared perception of the existence of a range of knowledge or capacities useful for the organisation. However, it doesn't imply the existence of a direct relationship between the produced

knowledge and organisational performance (Ingham, 1994). Moreover, the produced knowledge may differ from the expectations, even when the learning processes are consciously and purposely started.

For organisational knowledge to be produced two conditions have to be guaranteed: “content readiness” and “aptitude to learn” (Ingham, 1994). Content readiness is, somehow, linked to the concepts of tacit and explicit knowledge. Just as in Nonaka (1991), we defend here that both of them can be shared. However, the direct sharing of tacit knowledge, that is, without turning it explicit first, not only turns its use more difficult on the part of the organisation as a whole, as it turns impossible to say to what extent the knowledge internalised by the apprentice seats on the foundations of the knowledge detained by the master. On the other hand, the aptitude to learn is influenced by the individual and organisational knowledge bases and by the exercise of individual competences that allow the knowledge to be produced.

We assume that individual and organisational learning processes can, eventually, be interrupted and retaken later on. In the model of individual learning proposed by Kim (1993), for example, the observation phase is followed by the evaluation phase, which proceeds the project phase, being this one followed by the construction phase, that is, acting. Nothing is said concerning the possibility of the process to be temporarily suspended, with the individual observing and evaluating, or even projecting, but not acting immediately. And the same happens with OL. This subject is directly linked with the process of measuring the results of the learning processes.

Although some defend, strongly, the inadequacy of using an information processing model to study social representations (Durand et al., 1996), we will depart here from the beginning that, without data, information and knowledge cannot exist individual or organisational learning. For example, at the individual level, it seems unquestionable that it has got to exist, in any point, some kind of acquisition process; at the level of the organisation, diffusion or sharing processes has got to be initiated. Communication and interaction, that are so important to them, involve data, information and knowledge. In fact, whole the disciplines or specialties revised by Easterby-Smith (1997) deal, in a way or another, with this dependence. This fact is, even perhaps, the only point of convergence among them. Its presence is so strong and remarkable that this perspective is faced, in this study, as capable of linking the several complementary disciplines often seeming contradictory.

Departing from the model proposed by Kim (1993), but stressing the importance of the sub-processes described by Huber (1991), the model also considers the influence exercised by external and internal factors, normally neglected, or just considered indirectly or implicitly, in most of the analysed models.

The external environment and internal variables as the culture, the strategy, the management/leadership, the formal and informal structure, the people, the routines, procedures and processes, the financial resources and ICT are presented as able to condition OL, in direct and indirect ways. Directly, these factors influence learning when they impact on the way as data, information and knowledge are acquired, interpreted, shared and stored. However, they also influence the learning processes in an indirect form, as they also influence the adoption and use of ICT. On the other hand, the adoption and use of ICT ends affecting these factors and, by this mean, the way they influence the learning processes.

Apparently, the model just describes part of the existent interactions. Remember, for example, the perpetual academical discussions around subjects as the precedence of strategy over structure (Amburgey & Dacin, 1994) and vice-versa, and the crossed influence between strategy and technology (Itami & Numagami, 1992). We defend that these influences among the factors materialize via OL. Therefore, the hatched lines (Figure 1) should not really exist in the model. Its inclusion sought, on one side, to facilitate the perception of these indirect relationships, using ICT as an illustration, and on the other hand, to stress the role of a factor considered decisive to these processes.

This way, we emphasize the increasingly important and higher level role these technologies are playing and get the attention to the way as the external environment and the several internal factors can inhibit the acquisition of ICT and hinder its efficient use. On the other hand, we answer to the

need identified by Huber (1990) of moving forward in the creation of a theory concerning the effect of these technologies in the organisations. A great part of what is known concerning the factors affecting organisations and their performance was developed when the nature and the mix of ICT were relatively constant, through the time and through the organisations of a same type.

The interpretation joins the evaluation and the project phases described in Kim (1993) model and the creation of individual and shared mental models. The group is seen as a fundamental link between the individual learning and the organisational learning (Unger & Lorscheider 1996). The concept of distribution present in Huber (1991) was substituted by sharing, considering that, unless the individual works as a perfect reflector of the information and knowledge that reach him, he ends reflecting in them its own mental models, so it is, in every sense, a sharing process.

With this model, we expect to contribute to the resolution of some of the identified problems and to the pre-empting of some of the needs pointed by several authors in the fields of change management and OL.

Namely, it is sufficiently broad to be applicable to any organisation but capable to adapt to the specific context of a specific organisation (Mackenzie, 1994). It is expandable, allowing the inclusion of new aspects (Schwandt, 1996). Emphasizing the individual, but also the role of the environment, the culture, the structure and the routines, procedures and processes, it allows to approach and to integrate several learning levels.

On the other hand, it stresses the role of “softer elements”, as “people, leaders and values”, as well as “harder elements”, as “technology, strategy and its structures” (Beer & Eisenstat, 1996). Many of the investigators that have been studying the implementation and use of IS/ICT centred its attentions in very big North American organisations. A characteristic common to these works is the clear absence of the social, cultural and institutional factors (Hinton & Kaye, 1996).

4 CONCLUSION

The model presented in this paper integrates the several models found in the literature. A major contribution is the way it stresses the influence of the external environment and of internal organisational factors in the learning processes and explicitly shows how they can affect it. Also, the way it points out their functions as repositories of the learning done by the organisation. Still, the model creates the opportunity and the justification so that the specialists on organisations, communication and information systems can take conscience of the existence, content and relevance of the work done by researchers of other study areas (Huber, 1990).

The model was initially used to study the process of IS and ICT adoption in SME. The methodology involved inquiries to 458 companies and procedures of multivariate data analysis, namely, Principal Components Analysis and Cluster Analyses. The total procedures enabled empirically finding out which are: the factors behind the delaying in adopting ICT and the factors that lead to its adoption; the factors that facilitate its initial usage and the factors impacted by the ICT adoption and use.

The model was also used to study the global process of organisational learning, through multiple case studies that involved twelve enterprises. The total procedure included semi-structured interviews, documental analyses and direct observation.

Later on, the model here presented was used to guide the development of tools for Information Management Systems auditing.

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