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INFORMATION SYSTEMS PLANNING: CONTRIBUTIONS FROM ORGANIZATIONAL LEARNING

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Abstract: A new outlook on the process of information systems planning is required with the emergence and consolidation of new perceptions and concepts of organizational learning. The field of organizational learning offers viable opportunities for gains in the planning processes of organizations. Several authors point to processing of information as a relevant source of increased productivity and competitive advantage in our society. However, within the field of Information Systems (IS), several problems pertaining to planning and effective use of new Information Technologies (IT) have challenged researchers to find ways of minimizing the problems pertaining to IS planning, and implementation. This paper analyses the impact of Organizational Learning, and the opportunities generated by Organizational Learning on IS planning, as responses to the difficulties of implementation of technology-based plans and the resulting organizational changes.

1. INTRODUCTION

Organizations have been facing an extremely competitive environment inserted in a culture deeply affected by new paradigms introduced by the so called information society. The new reality provokes an intense reorganization in society, generating changes in organizations (Tapscott, 1997). In

order to continue growing, or even to continue surviving, they need to change, because the social, economic and political paradigms are changing and the current models of the enterprise organization have been strongly questioned. In this new context, information technology's (IT's) role becomes relevant. The effective use of IT by the organization has been considered crucial to its survival and competitive strategy (Porter and Millar, 1995). Due to this importance and to the high investment needed to incorporate the new technologies, organizations must look for a maximum of guarantees to assure IT's usage.

Due to this focus, information management must be centered on organizational aspects and not merely technology. Information is extremely important to management. We have the emergence of a new area in administration, a need for management of information and more importantly, a need for strategic management of information. Hence, there emerges a new class of problems to be formulated and solved, centered on this strategic resource, the information.

In reference to the contribution of Organizational Learning, it is important to point to the view of DeGeus (1998), in which the process of decision making and planning are learning processes in themselves, leading to the conclusion that all businesses learn all the time. According to this perspective, there is no need to build an organization that learns, because they already exist. The issue then becomes the fact that the conventional ways in which businesses learn are inadequate for the time in which we live, where change, transformation and creativity are first order demands. The questions to be answered become: how to improve the process of decision making (based on organizational planning), and how to accelerate and strengthen the learning processes existing in organizations. The development of a strategic planning process in IS is an opportunity to exercise and create a culture of Organizational Learning within the organization's IS area.

In Section 2, we present an overview of the context of strategic planning schools of thought. We also present an overview of the main studies of IS strategic planning, particularly those relating to the implementation. In Section 3, we present what we believe to be the main contributions of several authors in the field of Organizational Learning. In Section 4, the main barriers in the processes of learning and planning are shown and comment. Finally, we present considerations on the topic in Section 5.

2. INFORMATION SYSTEMS PLANNING

Mintzberg (1995) developed a study classifying the diverse schools of strategic planning into three main categories: prescriptive, descriptive and configurational. The prescriptive school represents the mathematical and analytical planning tradition, viewing the strategic process as a conceptual

project of formal planning. The planning process begins from an internal (organizational) and external (environmental) analysis, from which the strategic alternatives are developed. The choice and implementation of the best strategy is the final result of the planning process.

The descriptive school sees the planning process as a learning process, taking into account the mental aspects relative to the decision process, and the way of thinking and value systems of the decision-makers. In this respect, unexpected situations, politically-based or not, must be used in learning and in action, directly affecting the strategies.

The configurational school deepens the prescriptive school's perspective, and is based on the knowledge of specialists and managers. This knowledge is transformed (formalized) and used in manipulating management issues.

Several authors (Reponen, 1998; Lederer and Sethi, 1993; Gottschalk and Lederer, 1997) have examined the nature of strategic planning in the field of Information Planning. Studies were developed to evaluate whether the IS strategy should be planned separately, or if it is a continuous process in which new ideas surface during the operation. The starting point for these authors is the descriptive school, where formulating the strategy is viewed as a learning process. In this sense, transposition of the ideas of the prescriptive school to the field of IS strategic planning is sought.

Another line of research and studies (Galliers, 1994; Lederer and Sethi, 1992; Lederer and Sethi, 1996; Prekumar and King, 1994; Gotschalk and Lederer, 1997) deals with the question of implementability of plans in the field of IS. Implementability may be described as a series of steps that must be taken by the agents of the planned change process, in order to inplant these changes. According to Lederer and Salmela (1996), the implementation of IS strategic planning is the process of executing the planned changes, by the following: the development and installation of an IT architecture; the development of information systems; the generating of databases; the installation of communications systems; and the creation of organizational changes; and the training of users and managers.

These studies above show 14 practices influencing the implementation of Strategic Information Systems planning. The chart below (Figure 1) shows a model for research on SISP implementation proposed by Gottshalk & Lederer, 1997.

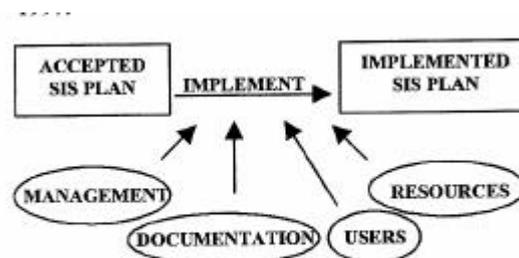


Figure 1 – Model for Research
Source: Gottshalk and Lederer, 1997

The practices have been categorized into the following four groups: management practices; plan documentation practices; practices representing resource availability; and practices related to users of new infrastructure architecture and information systems. The management group has the following practices: management monitoring of the implementation process; management commitment for implementation; management action to identify resources for implementation; and management action to avoid resistance to implementation.

The documentation group has the following practices: benefits documented in the plan; relevance of projects in the plan to organizational goals; implementation analysis in the plan; and clarity of presentation of the plan. The resources group has the following practices: availability of IS specialists; and availability of needed information technology. The users group has the following practices: quantity of user training; user involvement in implementation; and avoidance of resistance to adopt plan.

The implementation process is normally treated as a process of management of innovation and organizational change. Implementation is the construct represented by the trajectory between the "Approved Plan" and the "Implemented Plan". This trajectory is influenced by the fourteen practices previously described (indicated in the groups Management, Documentation, Resources and Users). This construct is only marginally discussed in the literature. In reality, approved plans that show 100% expectation of being implemented in the beginning are, in the end, only partially implemented. The reasons for this may be found in the practices described above, which cause changes in the priorities, thus the expectations of implementation are reduced with passing time.

The implementation of IS plans is an important issue for organizations dealing with fundamental problems. Gottshalk and Lederer (1997) interpret these problems as practices that may be adequately resolved, increasing the degree of implementation of plans. Several authors studied in this respect, present the practices that they consider most critical in the process. Earl (1993) found evidence that when resources are not made available, management hesitates, generating problems with the technology and increasing resistance from personnel. Galliers (1994) identified the difficulty in recruiting qualified professionals as being the greatest barrier to implementation of plans, whereas Lederer and Salmeia (1996) focus on the issue of plan content and its comprehension by those involved in it. Lederer and Sethi (1992) point specifically to the absence of commitment from upper management. Lederer and Sethi (1996) identify preparation of the migration plan as being the most important aspect. Finally, Prenkumar and King (1994) find that the most important implementation mechanism is mounting a monitoring system to follow the implementation process and to generate feedback

It is interesting to note that no external environmental characteristic is listed as a major practice on this list. The authors argue that other studies (Salmeia, 1996) made a distinction between organizational and environmental characteristics when studying SISP in turbulent environments. They found that plan implementation is more affected by unpredictable changes in the external environment than by unpredictable internal changes. But past research indicates that organizational (internal) practices are more important than environmental characteristics. A possible interpretation of this study's research finding is that environmental characteristics indirectly influence SISP implementation through organizational practices.

We can identify the great majority of practices that influence the implementation of IS plans, as being related to issues dealt with in organizational learning. In other words, organizational learning issues greatly influence the implementation of IS planning. The incorporation of organizational learning techniques and principles may be an effective response to the difficulties. Of all the relevant aspects indicated by each author, there is one unifying point: they all refer to issues of learning (shared objectives, mental models, commitment and participation). The incorporation of the migration and implementation plan, and the definition of the strategies of the changes must be part of the plan itself. We can visualize the planning process as a continuous learning process.

In the next section, we will identify the main theories in the field of organizational learning as mentioned above, and their relation to the planning process.

3. ORGANIZATIONAL LEARNING

3.1. Fifth Discipline

One of the most interesting aspects of this study is the search for answers to implementation of the five disciplines in organizational learning (Senge, 1990), as a means of making the process of technology-based change viable. The relevance of these disciplines to the effective implementation of IS plans is highlighted. The implications of each learning discipline on IS planning are:

Shared vision: one of the objectives of a plan in the IS field is to obtain a vision on how to use the technology that is shared by all those involved. The challenge is how to obtain this common vision, a pre-requisite to the necessary commitment for implementation of the plan. This may be obtained through cooperative learning efforts with small groups learning together and sharing common views.

Team learning: the creation of a strategy is normally, and not only in IS, a matter of fostering teamwork, involving representatives from several areas in the organization. The objective must be to

generate learning in the group. The learning process in groups is more than just the sum of the individual learning or individual knowledge. It can be improved using appropriate techniques based on group dynamics.

Systemic thinking: this involves one of the basic tenants of IS, the systemic focus on the resolution of problems, beginning from a view of the whole and searching for the fundamental causes of the problem. The search for technological infrastructure solutions of long ranging organizational impact, requires this kind of vision. That also acts as an integrating element between users and the technical group.

Personal mastery: this involves a basic pre- requisite for the development of intelligent organizations in order to establish the initial conditions for learning and the capacity to participate in the process of change. This is particularly so in the field of information technology which has evolved from levels of historically accumulated capabilities, and training and technological abilities, into reeducation for new types of work.

Mental models: This involves the ability of management levels to deal with the issue of mental models of those involved in the process of change. These are represented by resistance to new ideas, particularly new information technologies. These mental models can become powerful initiators of the process of change in regard to IT use of and IT results. Usually the mental models is the main reason for fear of change and avoidance of change.

Senge sees the learning process as a continuous flux (Figure 2), where the development of new abilities and aptitudes by the group, affect the individual's perception of reality. Therefore, the new sensibility and knowledge change the existing mental models, creating conditions for the process of change. The process allows people to see reality with new beliefs and attitudes, and facilitates the development of abilities and aptitudes, closing the learning cycle. In general and as in the planning process, organizational learning occurs when the individual learning impacts the group as a whole and transforms it.

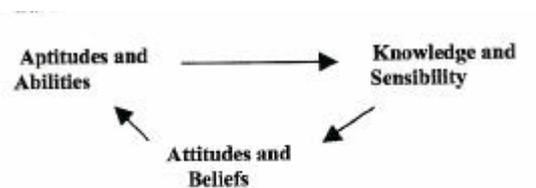


Figure 2 – Senge's Learning Model
Source: Senge et al. (1994)

3.2. Levels of Learning

The changes in individual behavior are considered a primary efficiency criterion by organizational development practices and research. According to Argyris (1993), one way to alter behavior is through direct modification. Several authors preach this kind of vision, through abrupt processes of organizational change and transformation. Another way is to understand the meanings that people generate when they interact with each other. Sociologists, cognitive psychologists and many ethnographers and existentialists have worked with this approach (Argyris and Schon, 1980). These studies approach the issue through the viewpoint of the construction of the social and individual reality. In this sense, Argyris and Schon identify important differences between the meaning of the intellectual constructions and the actions of the individuals.

We can identify that the learning process happens under two conditions: when the organization achieves its goals (unification of its action project and the obtained result); and when the organization identifies differences between the intentions and the results and corrects these differences (the differences are eliminated). Argyris points out that organizations do not carry out actions that promote learning. It is the individuals acting as agents of the organization that produce the behavior that leads to learning. The organizations can create conditions that significantly favor individuals to model the problem, project a solution and produce an action to solve the problem. Methods and work methodologies, in the different areas of the organization, may favor the change environment or make it difficult. On the other hand, individuals may also bring obstacles to a learning situation (change) that are relatively independent from the requirements of the organization.

In this sense, Argyris (1993) presents the learning process through the simple cycle and double cycle diagram (Figure 3). When a result is corrected without questioning or changing the principles of the system, the learning process is a simple loop. A double loop occurs when the results are corrected from an examination of the principles that lead the system. Only then is action taken. The diagram shows that learning does not occur until a result is produced. In this perspective, learning has not occurred if someone in the organization has discovered a new problem, or has found a solution to the problem. Learning only happens when the solution found is carried out (transformed into action), and the knowledge is appropriated and practiced. This is particularly relevant in IS strategic planning, because discovering the problems and proposing solutions are necessary conditions, although not sufficient for organizational learning, that is, the change process.

Consequently, we may conclude that the process of strategic planning is an opportunity to create and accomplish a culture of organizational learning in the individuals and in the organization as a whole. On the other hand, the larger the learning culture, the better the developed plan. The

dimensions of the action become inherent to the process of plan elaboration in itself, carrying all the issues relative to implementation of the proposed plan.

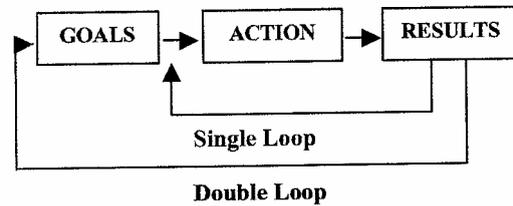


Figure 3 – Single and Double Loop Learning
Source: Argyris, 1993

It must be clear that the execution of the learning loop (single or double) occurs through the actions of the individuals, groups or inter-groups, within the organization or among organizations. In this way, the participation and relevance of the individuals in the process is seen, and the proposed model should incorporate aspects that distinguish and reinforce the preoccupations relative to the change process in the analysis phase (evaluation and strategy), and in the implementation. This is particularly important for the planning process, since the double loop implements the ideal conditions for the development of the strategic planning process, where questioning the principles leads to a deeper project in terms of the organizational impact and significance. This involves using a systemic approach and questioning the mental models. The acting toward organizational principles and goals may establish the necessary conditions to obtain a higher level of commitment, due to the level of consistency and coherence in the proposed changes. On the other hand, this allows for a more adequate view of how to lead the process of implementation.

3.3. Planning as Learning

The capacity of adaptation and flexibility in view of environmental challenges, according to DeGeus (1995), depends on the capacity of upper management of a business to understand what is happening in the business environment and to act according to the information with appropriate commercial measures. That is, adaptation and flexibility depend on institutional learning. This is the process whereby management changes the shared mental models (Senge, 1990) of the business, its markets and its competition. For this reason, we can think of planning in terms of learning, and of corporate planning in terms of institutional learning.

DeGeus (1995) considers that the best learning process is the one that happens in groups that accept that the whole is greater than the sum of its parts, and that there is a good that transcends the individual. This consideration prompts us adopt the discipline of systemic reasoning proposed by

Senge (1990). The role of management levels and the need to adjust the existing mental models is emphasized for the beginning of organizational learning process.

The only competitive advantage that the business of the future can have is the ability to learn more quickly than its competitors (DeGeus, 1995). Thus, the successful businesses will be those that continually pressure management to constantly review and revise its vision of the world. The author concludes, affirming that the challenges facing the planners are considerable, just as the rewards are. In this sense, the author does not differentiate planning from learning. He visualizes the planning process as a great process of organizational learning.

Deepening this analysis, Piaget (apud DeGeus, 1997) proposes the existence of two kinds of learning: by assimilation and by accommodation. To learn by assimilation means to acquire information when the learner has already incorporated structures to recognize and give meaning to the signals. In learning through accommodation, the learner goes through a process of internal structural change of beliefs, ideas and attitudes.

We can see that learning by accommodation is the most appropriate process to follow in the planning process, acting in relation to people's mental models, and requiring as a consequence, changes in their behavior. This kind of approach is necessary in order to obtain a genuine common objective in the organization, and to obtain a level of commitment that can guarantee the success of the change process as a whole. All forms of learning are successful precisely because they are incorporated into the decision-making process. Decisions made in a planning process that reach a new level of knowledge and effectively become a new course of action, are in themselves examples of learning through accommodation.

4. BARRIERS TO PROCESS OF LEARNING/PLANNING

The center of this preliminary analysis is related to implementation of the IS strategic plan in the organizations, where the role of organizational learning is fundamental in allowing for greater participation of the individuals. This is so because organizations tend to resist changes once the success of a particular strategy confirms the validity of existing processes. Focusing on planning as a learning process work must be carried out in such manner as to minimize the main barriers to learning (change), arisen from the developed plan, and to facilitate the process of change (learning). The barriers and facilitators of the learning process are focused on the individuals and their behavior facing change, in agreement with previous analyses. The facilitation of the change process arisen from the plan generated from the IS Strategic Planning process, is directly related to the learning conditions existent in the organization, the conditions generated during the planning process and as a consequence of it. An inventory of learning potentials must be developed, searching for decisive

information about the critical factors involved. Information must be gained about the learning needs, the existing knowledge base, the used learning forms, possible agents of the learning process (change), external and internal factors that may accelerate learning and forces that may generate barriers to learning. If this information is insufficiently identified, the learning process may fail and stop the implementation of change, due to failure of the organization in generating adequate conditions for change and for follow up (evaluation).

The development of strategies is a learning exercise in which the future is modeled as a consequence of the present, while Strategic Planning is a learning process about where the future of the organization will be. The organization must examine its potentials in detail. To take into account the needs of the users and the development of markets and technologies, strategic planning must be dealt with from top to bottom and from bottom to top within the organization. This need for a dual approach implies on the involvement of many people in the process. Strategic planning may be understood a learning process taken up by a group of people that will think together about the future of the organization. The development of a participatory planning process, involving different members of the organization, forms the bases of the learning process, during which individuals will work together in forecasting and planning the future. Planning development must utilize techniques and instruments that potentiate participation and learning:

- games in microworlds;
- communications techniques;
- scenario planning method;
- simulations;
- strategic control;
- group dynamics;
- action learning.

5. CONCLUSION

Despite recent developments in the field of IS, the formulation of the IS strategies continues to be the main critical problem in information management (Galliers and Baets, 1998). In order to face the demands of the business area, the planning process in IS, must implement a vision of IS strategic planning as an interactive learning process. It must have the objective of developing and redefining business processes by incorporating the use of IT.

Implementable IS strategies must be generated from a participatory approach, with increasing and cumulative understanding of the use of IT. Attaining the environment of a learning organization

is necessary for an effective model of IS planning, which can be implemented with attainable results.

The challenge is in building an organizational learning environment. This is understood as an environment that stimulates and favors creation, the acquisition and transference of knowledge, and that allows modification of behavior to reflect the new knowledge and insights. Although some authors may understand this kind of organization to be utopic, this is the type of organization that is prepared to develop and incorporate new technologies. This type of organization will be prepared to establish an environment of change required by today's information society (Tapscott, 1997). This offers the solution to the main problems identified in relation to the capacity of creative and consequent development of IS plans. This increases the implementability of these plans in the context of participation and commitment. The approach focuses on planning as an organizational learning process.

In conclusion, the major role of the administrator today is to transform problems into challenges. This can be reached by incorporating aspects of organizational learning and using creativity as a differentiating factor of administration. This approach acts as an important tool, breaking mental models and in implementing a systemic vision in the organization.

In this context, IT can facilitate and allow for creativity and learning within organizations. Thus generating a mutual re-enforcement process, where new technologies re-enforce the learning environment, and the learning environment allows for the introduction of new technologies (changes) in the organization. The challenge resides in conceiving a planning model in the IS area that incorporates these elements and allows the IS planning process to generate the conditions for creating and exercising a culture of Organizational Learning in the business.

REFERENCES

- ARGYRIS, C. *On organizational learning*. Oxford, Blackwell, 1993.
- ARGYRIS, C. e SCHON, D. *Organizational learning*. MA, Addison-Wesley, 1980.
- DeGEUS, A. Planning as Learning. In: *The State of Strategy*. *Harvard Business Review*. USA, Harvard University Publisher, 1995.
- DeGEUS, A. Planejamento como aprendizado. In: STARKEY, K. *Como as organizações aprendem*. São Paulo, Futura, 1997.
- DeGEUS, A. *La empresa viviente*. Buenos Aires, Granica, 1998.
- EARL, M. Experiences in strategic information system *planning*. *MIS Quarterly*(17:1),1993.

- GALLIERS, H. e BAETS, R. *Information Technology and Organizational Transformation*. Chichester, England, John Wiley and Sons, 1998.
- GALLIERS, H. Strategic information system planning: myths, reality and guidelines for successful implementation. *Strategic Information Management*, Oxford, 1994, pp.129-147.
- GOTTSCHALK, P. e LEDERER, A. A review of literature on the implementation of strategic information system plans. *Proceedings of ICIS 97*, Atlanta, USA, 1997.
- LEDERER, A. e SALMELA, H. Toward a theory of strategic information system planning. *Journal of Strategic Information System*, 1996.
- LEDERER, A. e SETHI, V. Root causes of strategic information system planning implementation problems. *Journal of MIS* 9(1), 1992.
- LEDERER, A. e SETHI, V. Key prescriptions for strategic information system planning. *Journal of MIS* 13(1), 1996, pp.35-62.
- MINTZBERG, H. Crafting Strategy. In: Harvard Business Review Paperback. Boston, *Harvard Business Review*, 1995.
- PORTER, M E. e MILLAR, V. E. How Information gives you competitive advantage. *Harvard Business Review*, Boston, Jul/1995.
- PRENKUMAR , G. e KING, W.R. Organizational characteristics and information system planning: an empirical study. *Information System Research* 5(2), 1994, pp. 75-109.
- PROBST, G. e BUCHEL, B. *Organizational learning*. London, Prentice Hall, 1997.
- REPONEN, T. The Role of Learning in Information System Planning and Implementation. In: GALLIERS, H. e BAETS, R. *Information Technology and Organizational Transformation*. Chichester, England, John Wiley and Sons, 1998.
- SALMELA, H. *The requirements of ISP in a turbulent environment*. Ph.D. Dissertation. Turku School of economics and business administration. Sarja, 1996.
- SENGE, P. M. *A Quinta Disciplina*. São Paulo, Best Seller, 1990.
- SENGE, P- M-, ROSS,R., SMITH, B., ROBERTS, C. e KLENER, A. *The fifth discipline: fieldbook*. New York, Currency Doubleday, 1994.
- TAPSCOTT , D. *Economia Digital*. São Paulo, Makron Books, 1997.