

# **The organizational impacts of information systems: Analysis and proposal of a methodological framework**

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## **Abstract:**

The aim of this paper is to analyze organizational change imposed by the diffusion of ICT in business. From here emerges the problem of the impact of information systems and organizational changes within the company. Knowing that the company is both actor and object of change imposed by the adoption of an information system, it is interesting to ask: what is the impact of information systems and transformations the evolution of the company?

**Keywords:** information system, organizational change, organizational impact, diffusion of ICT.

## **Introduction:**

Organizational change become constants in business life. In this sense, several studies have been conducted by researchers (such as the work of Lawrence and Lorsch, Mintzberg, Blau, Pugh, Woodward), whose works were followed by Reix (1996, 1999). This research has highlighted many factors In a changing environmental context, where economic, political and social change quickly and where information technology and communication (ICT) evolve just as fast, systematic adaptation that may influence the contingencies company and its organizational and strategic choices. Indeed, the stabilization is often disturbed by challenged imposed by a change in the business context and accompanied by adequate organizational transformation process.

In our work, we focus on organizational change imposed by the diffusion of ICT in the business. Thus, the objective of our research is to examine the impact of information systems on the organization and changes within the company. Knowing that the company is both actor and object of change imposed by the adoption of an information system, it is interesting to ask the following question: **What is the impact of information systems and transformations the evolution of the business?** We consider the integration of IS as an organizational innovation and thus we analyze its impact on the entire organization whatsoever in the decision-making structure and management system.

Our work is divided into two parts. First, the explanation of the concept of information system. Then, the analysis of organizational implications of the integration within an enterprise. The conclusion will provide a final summary of the relationship "information system" and "organizational change".

## **I. What is an information system?**

For the definition of an information system, we will first start by giving the definition elements, then the activity (or process) of SI, interest and finally his typology.

## **II. Elements of Definition:**

The term information system (MIS English: management information system) date sixties (Moigne, 1986). The term was used in various senses and its appearance is historically linked to the use of computers in information management in the company. However, IS can be set independently of the technology used to realize it, because the computer is a tool for performing computerized IS.

An information system is a set of people, procedures and resources to acquire, process or transform, store and communicate information gather information, process it and distribute it within an organization (Reix, 1983, O'Brien, 1995).

Central to this definition is the concept of system. We find it difficult to talk about the system, without some interaction and interdependence between the different parts that constitute it, and allow them to act interactively to achieve the same purpose. Thus, we can say that IF is a set of elements (components) and activities combined with each other.

The definition of an information system can distinguish three components of SI namely:

- 1. Men:** In this case, we speak of computer technology to control users and managers. They play the role of end-users to manage information, but they can also play a role in the strategic use of IT, considering how information technology must be mobilized for their own purposes-and-computer help in identifying the needs of SI. Indeed, the SI are systematized by computer, given the concerns of managers and the answers they provide to facilitate the management of information within the company.

**2. Material:** It includes different machines (eg computers), media (eg tapes) and programs (software) used by people in the processing of information from their acquisition to their dissemination and use

**3. Procedures:** For procedures on means, how tasks and information processing are divided, shared, and performed by members of the company, more precisely the set of rules, management practices and culture of the business. You can also designate procedures methods and models for analysis and research, as well as instructions for the computer to process information (eg software).

The discipline of information systems is at the interface between the theories of business organization, the vision of a complex system, the human cognitive processes and technical implementation and processing: computing . (Ghomari. A-R).

## **I.2. SI activities:**

Activities of an information system include both:

→ Acquiring Information: The information collected may be the result of a voluntary (formal source) or repetitive information (data relating to commercial transactions) and / or the result of an involuntary process (source informal) or information that is not repetitive (data for strategic decisions). In all cases, these data were combined by conducting entry operations, formatting ... etc

→ The information processing: In this phase, we transform data into information. In other words, we treat data collected and compiled, by sorting, comparing, in the interpretants and ranking to generate a synthetic image, coherent and meaningful to the user.

→ The storage information: This activity is to store the information and / or data, it organizes the structure and maintains quality by continuing operations correction and update.

→ circulation and dissemination of information: information is transmitted in various forms to users (message, reports, printed lists, graphs generated by VDUs), this information will be disseminated through networks such as the telephone , Internet, intranet ... etc

A SI combines three different dimensions, human, technological, organizational, which are complementary to perform a number of operations organized and well defined. A SI is not only a collection of individuals who collect data, much less simple procedures or methods by which management will be shared tasks and information. This is not a hardware-only-to disseminate and preserve information and / or knowledge. IF A is the inclusion and integration of the three dimensions that constitute (human, technological and organizational) that can perform the activities related to the management of information within the company.

The definitions take into account the SI manuals as may be designated by material, index cards, pens, paper, carbon ... etc.. Same activities performed can be performed manually (noting data collected on paper, structuring on cards and keeping them in binders). If one refers to the tools and technologies when speaking of hardware, this is due, in fact, the use of computers in all SI at least to automate the processing and storage of information. In the case of our work, we considered the computer where the SI and informal human side will always have its place, because behind the SI, there are always concerns and managerial considerations.

## **I.3. The interest of the system:**

Elements of su-mentioned definitions are incomplete because they fail to address a very important point that is the purpose of IF in the company. In other words, why use an IS in the business? To answer this question, we propose another definition: "... we call IF the device by which the company informs to manage its operation and evolution. "The

establishment of an IS is not limited to the management of information flow, but also to the achievement of business objectives. It is quite clear that a manager must decide, react, plan and control to ensure the operation and development of its business, whose success is determined by:

- A good consistency between the different members and business functions;
- A good fit with its external environment.

From this definition, we can say that the SI enables the company to meet the challenges that it launches its internal and external environment. SI plays an important role. It allows you to coordinate services and from different people, and commanded them to achieve a particular goal. It offers solutions based on information technologies and allow thus to the company to have information on its competitors, its customers, suppliers ... etc.. Therefore, it can adapt and evolve with its external environment. Thus, an SI is a coherent whole that ensures the acquisition, processing, storage and dissemination of information to achieve a management objective.

In other words, it manages information content, by conditioning procedures and management constraints to achieve a specific goal. The main contributions techniques of electronic information can be summarized in three main contributions:

First Time compression processing data (sorting, calculating, selection and transmission) ... to produce relevant representations within very competitive. Then the compression space by sending huge volumes using internet between two points, regardless of their location in the world. Finally, expansion of the stored information with new storage methods for storing and archiving large volumes of data.

#### **I.4. Typology of information systems:**

Based on the three levels shown in the pyramid of management Antony, we distinguish between three main types of IF:

##### **a) Information Systems (MIS):**

GIS support the management of the company. They provide management information (in the form of reports) to decision making. They consist of:

→ systems reporting (SPR). These systems provide information in the form of reports and displays predefined formats.

→ Systems Decision Support (DSS). These are computerized systems that use data, tools, models, to give support to the interactive and timely decision making managers.

→ Management Systems database (DDBMS). These systems provide data management and common treatments. They also provide storage, coherence and sharing between different business functions. Among them we can mention: data mining and data warehousing.

→ The executive information systems (CIS). These systems rely on communication and sophisticated graphics software to support the business strategy.

→ Expert systems. These computerized systems act as an expert consultant who provides advice to managers in a specific area.

##### **b) Information systems on the operation of the business (EIS):**

These systems process the information generated by the operating activities of the company. They support business transactions facilitate the control, communication and updating databases (tactical and operational level):

→ IT systems to the end user. These systems directly support the operating applications and user management.

→ The transactional information systems (STT). These are computerized systems that store and execute routine transactions occurred in the course of commercial activities (sales, purchases, deposits, withdrawals, payments).

→ The office systems (SB). Such as word processing software, email ... etc.. Designed to improve the work in the office.

→ Industrial automation. These systems operate under automatic control of a computer and make routine decisions for controlling some production processes.

### **c) strategic information systems (SIS):**

SIS systems are computer systems located at all levels of the organization and influencing the goals, operations, products and services or relationships with environmental organizations to enable them to stay ahead of the competition.

In fact, we have noted that some types of SI. This distinction is typically theoretical, because in the real world of business, these systems are interconnected and integrated. Thus, GIS and EIS are complementary. With the data exchanged between them, we can classify these systems, as they support the management (SPR, SAD, SID) or exploitation (STT, AI, SB). For example, through information systems inter-organizational (SIO) connected to STT, the company may use transactional processing systems inter-organizational allowing it to be connected directly with customers and better meet their needs . With databases updates by STT, the SPR provide accurate reports to management.

## **II. Information systems and organizational change:**

An organization can be characterized by various parameters at different levels of detail: its borders (and relationships with other organizations), its structure (division into units arrangement of these units), its particular properties relating to the specialization, the degree of formalization, the distribution of power (centralization-decentralization), modes of coordination, the general processes that take place (process communication, decision. organization is a process that is both differentiated and integrated to achieve an objective common (depending on the design of Lawrence and Lorsch). It is therefore necessary to create coherence between all elements at once different and interdependent. This definition of the organization, seems most appropriate for the development of an analytical relationship between ICTs (specifically SI) and the organization. in this perspective, we will focus on the relationship (SI-organizational change) and recalling that the existence of two main visions established by theorists:

-The deterministic view that technological determinism which gives the technology a leading role capacity structuring;

- Interactionist vision, which adopts a deterministic built recognizing both the structural capabilities of technology and the role of social context in the process of co-evolution. Confusion between the information system and the computer system is much the phenomenon of increasing digitization of reality and the evolution informational decisive role of IT in the organization.

According to R. Reix (2002), an information system play a key role in organizations, and its design has an impact on the design of the organization, individual roles and management process:

## **II.1. The design of the organization:**

According to R. Reix, SI within an organization can reduce the number of hierarchical levels, which explains the existence of a correlation between the development of the use of information technology and the flattening of the structure. This correlation was explained by improved coordination, increased the ease of communication and treatment by the possibilities of direct communication.

The second role of SI, to facilitate decision making. R. Reix explains the impact that information technologies should enable the transfer to higher levels of prior decisions to lower levels. This would lead to centralization. They should also allow the transfer of decisions to lower levels, resulting in an increase in the degree of decentralization. According to G. P. Huber (1990), through the use of communication technologies and decision support, has led to centralization over decentralization, and vice versa.

In addition, R. Reix found that the use of information technologies is accompanied by an increase in degrees of formalization and standardization of processes. It also found that one of the immediate impacts of the use of information technology is to improve vertical and horizontal coordination. That said, IF an impact on coordination, formalization and standardization.

However, the IS in an organization has an impact on the degree of specialization. Because it gives birth to new role (programmers, analysts, etc ...), and removes others (accounting clerk, etc.)..The SI also has an impact on job enrichment control. This by incorporating expertise in software, generally tending job enrichment "and self-analysis", and normally lead to more autonomy and responsibility on the part of the performers. Finally, new technologies have an impact on the business relationship insofar as the work becomes less "physical" and more intellectual.

### **The SI component of the structure of the organization:**

Structure is defined by the different units within the organization and allocation choices and coordinating human and material implemented between the different units. This requirement of coherence between the different elements of both embedded and justifies the use of SI to ensure the sharing feature representations and communication essential to the functioning of the organization. Thus, the SI determines the operation of the organization, firstly because it meets the specific needs of each internal unit (process) and on the other hand it meets the needs of communication between these units (process). We can summarize the role of IS in the organization as follows:

- ♣ Inform the process
- ♣ Automate the process
- ♣ Coordinate activities and resources of the process
- ♣ Structuring the process

In most cases, ICTs facilitate the development of flat structures due to their ability to reduce the number of hierarchical levels in the organization. Indeed, the new possibilities offered by communication systems allow treatment and rapid exchange of information and focused. Also, the computer network allows the intensity of a vertical and horizontal coordination and causes the appearance of the flat structures, open and flexible. ICTs facilitate a large number of individuals with access to information and encourage the participation of various individuals in the decision-making process.

However, it seems difficult to attribute solely to this trend in IT organizational structures. By definition, an IS is "An information system is a set of people, procedures and resources to gather information, process it and distribute it within an organization." IS are the result of a set of activities and organizational elements, human and technological,

interdependent but quite different. This heterogeneity makes the organization face a to a number of problems (interface and integration problems of choice of appropriate tools and procedures, selection of training programs tailored and cost issues) where does the difficulty of establishing an IS effective and capable of achieving the objectives of the organization.

## **II.2. The effects of information system management processes:**

IF facilitate the decision making in the organization, considered itself as a center of decision-making (specifically formal SI). Thus, the effects are most similar accessibility, quality improvement decisions and organizational memory.

Obviously, the speed and quality of decisions depends largely on the quality of the intelligence of the organization. Thus, an interactive and intelligent SI (using expert systems, systems for decision support, warning systems and calculates permanent trading systems and computerized documents) will provide exchange facilities and treatment among individuals, bodies and hierarchies of the organization, while increasing and varying the number of sources of information participants in decision making. SI, performing assessments and treatments on each automated transaction also have the ability to record and update all data through management systems databases very efficient.

For all these reasons, we can say that ICTs contribute to the development of organizational memory while improving intelligence and the quality of decisions taken by the organization.

To qualify these remarks, recalling that there's no technological determinism. In other words, it is the leaders' policies and strategies, cultures and skills will also depend on the speed and quality of decisions. Computer tools (smart) allow executives to deal with very large quantities informational problems on their level which militate in favor of increased centralization of decision making. Telecommunications allow rapid exchange cross and between the different levels of the organization would lead to a transfer of decisions to lower levels, so a degree of decentralization of decision-making increased. But the question of centralization or decentralization of decision-making depends not only on the technology architecture of IS but also policy and the functioning of the organization. In summary, the most likely effects of the use of information technology on management processes are (Besbas, 1988; Reix, 2002):

- Participation in the decision-making process: it occurs when a system can be accessed by several people, regardless of their position (geographical, functional, hierarchical, etc ....) in the organization.

- The intelligence problems: for example, supply management, monitoring of sales linked to a model trigger controls managed by computer, allows the manager to identify faster and better products "problem" .

- The speed and quality of decisions: occur through the use of models, the use of expert systems, the possibility of simulation before the election, etc..

- The storage Organizational resulted in the storage of information. The automation technology, can be, from transaction processing databases that form the essential components of organizational memory.

Information is a fundamental principle of strategy. In this context, the IF becomes an essential tool in business strategy. The IF allows the one hand, employees of the organization to implement and enforce management decisions. On the other hand, the SI can define a policy specific to the company (such as e-commerce, for example).

It seems that the evolution of the information system means more of an effect on the variables of the organizational structure. Thus the change of the information system is a key area of organizational change (Besbas. 1988).

## **Conclusion:**

Indicates that the dynamic changes affecting the company are more frequent, irregular and diverse, with a greater amplitude than in the past, which she was unprepared (Lesca, 1986). In this sense, companies need to monitor threats and detect potential opportunities in times compatible with their adjustment period. This involves the use of an information system where the accuracy of the information requested and the time factor would be essential.

The three traditional roles played by information in organizations: support for action, memory activities, assistance in decision-making, information technology and communication have added features that extend considerable extent information systems and profoundly alter the structure. This phenomenon is particularly visible through, for example, the requirement of systematic quality or the emergence of virtual information structures associated with real structures.

The organizational dimension of IS, is summed up in the fact that SI must imperatively be articulated according to the guidelines of the organization and managerial structure. Specifically, you must ensure that the implementation of an IS is consistent with the organizational culture, objectives and requirements managerial leadership (strategies, structure). At the organizational dimension adds a technological dimension. Obviously no one can dispute the fact that the evolution of SI is strongly linked to progress in the field of IT. However, the implementation of the IS should not be reduced to the decision to acquire a new technology. The current transition from SI to the desired state is achieved through a complex process that must be managed because of its organizational implications (the choice of the structure).

Implementation of IS is far from being the result of a simple and spontaneous. It is closely linked to the dynamics of organizational development and IT development. It must take account of the organization, its objectives, structure and capacity (physical, financial and human). Thus, if we want IF truly take their promises (in terms of efficiency and performance) and allow the organization to be always attentive to its environment, it is essential to consider them as a management object and not just as a management tool. In other words, SI is not static, it is contingent because it changes depending on several factors within the organization, which is why planning is very important IF and only explicit planning, allow the company to implement a scalable SI, which is able to adapt to changes in its environment likely management system and its structure. It is, therefore, clear that the information resources, material, financial and human, which comprises the SI must be managed rigorously, as the resources of any function in its own right, in the organization.

In summary, the notion of IF in its various dimensions reveals its complexity. And to understand their Hits on organizational change (structure), it is rather essential to have a comprehensive approach and interactionist.

Organizational change is a response adapted to new requirements and organizational behavior caused by internal or external factors. This is why SI are at the heart of organizational change. On the one hand, the SI is an actor of organizational change, insofar as its introduction and implementation requires the company to reorganize its activities and resources to change its goals and structure. On the other hand, the SI is regarded as an object of organizational change, insofar as it must evolve and adapt to changes and transformations imposed on the organization by its external environment. Therefore, it is important to:

- ♣ Although apprehend what uses may be intended for the SI? This issue sees the SI as a management tool for the conduct of the organization;
- ♣ Consider an object IF manage to be finalized, organized, led and controlled. The SI is a durable construction inserted in the organization so it is an entity that must be managed at different levels and on different time horizons.

In conclusion, this study has attempted to clarify the relationship between information systems and organizational change. Of practical case studies should understand the phenomenon in all its aspects in order to identify the impacts of organizational integration within the organization.

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