

# Empirical Study: Moroccan Information systems specificities for better IT Governance

M.Chergui<sup>1</sup>, H.Nahla<sup>2</sup>, A. Chakir<sup>3</sup>, S.Elhassnaoui<sup>4</sup>, Y.Sekhara<sup>5</sup>, H.Medromi<sup>6</sup>

<sup>1, 3,4,5,6</sup> ENSEM, Hassan II University, LISER-EAS Casablanca, Morocco

<sup>2</sup> Research Team "Systems Architecture" (EAS), Professor of Management – Marketing – Communication at ENSEM, Hassan II University of Casablanca, Morocco

**Abstract**— *The spread of information systems (IS) use has become an essential criterion for judging today's overall development level of a country and its attractiveness for capital and investment. Many international rankings evaluate the performance of different countries at this level. And Morocco occupies a disappointing position compared to its potential. Paradoxically, Morocco is lagging behind, although in the telecom sector, it is ahead of many developing countries. Thus, in 2015, the index NRI (Networked Readiness Index), measuring the preparation of an economy to make effective use of new information technologies (IT) published by the World Economic Forum, ranks Morocco in the 87th place. Indeed, with the exception of large companies that have implemented a set of tools to automate the process, a large number of SMEs and SMIs are very late as far as IT use is concerned. It means that IS in Morocco is still unable to achieve business perspectives for benefits and processes optimization. The aim of this article is to understand the particularities of Moroccan IS to understand the weak points to correct in order to govern well enterprise Information technologies.*

**Keywords**— *Information system, Information and communication technologies, IT Governance, Empirical study of Moroccan IS efficiency.*

## I. INTRODUCTION

The era of globalization demonstrates phenomenal use of hardware, software and services based on IT, electronics, telecommunications (including networks), multimedia and broadcasting of all kinds. These technologies, when combined and interconnected, used to search, store, process and transmit information in the form of various types of data (text, audio, still images, moving images, etc.), and allow interactivity between people, and between people and machines. The large use Information and Communication Technologies by companies has a significant impact on their activities. These companies exploit these technologies to take advantage of information in order to create value for their customers and to ensure profitable operations. The adoption of these technologies in the enterprise, induce continually fundamental changes in business functions. The Moroccan enterprises are not the exception to these changes. In fact, Morocco, as a

developing country with its history and its strategic location is opened to Europe portal for many years. Its external relations certainly allowed him to be aware of technological changes and evolutions, and to follow them wherever possible as well. Over the years, the ICT sector has evolved along the lines of political will. In 1956, the Ministry of Posts and Telecommunications has been created. In 1984, The National Office of Post and Telecommunications started its activities namely the establishment of an expansion and modernization of telecom networks. In 1995: it was the first introduction of internet for private use; Two years later, Morocco embarked on a restructuring of the sector through the adoption of Law 24-96, which helped launch the first stage of liberalization of the telecommunications sector. In 1998 public and private monitoring committee of Information Technology (STIC) has been created, composed of representatives of public and private spheres to make strategies and basis for technologies of information in Morocco. Since the year 2000, the evolution of ICT field was accelerated, many national projects were launched about [1]:

- Development of e-government
- Granting satellite licenses
- Audiovisual liberalization
- Development and launch of the National Cyber-strategy e-Morocco 2010 [2]
- high speed internet etc.

Now, Morocco has matured to develop studies and Congresses for changes in usage trends in information and communication systems to:

- Develop an inventory of integration of information systems in the Moroccan enterprises;
- Identify challenges and priorities of the Directors of Information Systems;
- Measure the match between the needs of businesses in information systems and solutions on the market.

In this perspective, we conducted an empirical study on perception of Moroccan information systems uses for enterprise decision making by 51 Moroccan managers of high level in different organizations. Analysis of the results allowed us to propose convenient IT Governance system for Moroccan specificities.

The article is organized as following; the second section will be about information systems history and evolution, the third section will present the empirical study, section 4 will expose the IT governance model proposed to well manage the IS according to the Moroccan context.

## **II. INFORMATION SYSTEMS**

### **A. State of art**

We can define an information system or S.I in various ways:

This is an organized set of elements used to group, classify, process and disseminate information on a given phenomenon [3] Another way to collect an SI is described as the an organized grouping of resources (staff, materials data software procedures ...) to collect, store, organize, process, transport and distribute information as text images, sounds or data encoded in an organization [4]

An I.S is also a set of elements in dynamic interaction organized around a goal. [5] According to this definition, an Information System is a set of elements in dynamic interaction organized around the goal of managing and processing a set of data on the structure in which it is immersed. In short, there are several definitions of the concept that would be found in the literature; however all intersect to describe the same concept. To better understand the concept of I.S in a company, it should better to be a step back, in order to grasp the origins.

In fact, IT is a relatively young science compared to other areas of investigation. it returned that history on I.S which are a consequence of computerization of companies would be relatively easy to browse [6]

Long before the 70s, computers were already used in enterprises; although sometimes having impressive physical proportions in comparison with nowadays microcomputers. [7] The need to computerize businesses is partly due to the need to automate tasks, increase productivity, speed, efficiency and effectiveness in the implementation and especially a good coordination of the various components of 'business. Computers were not very advanced (compared to those of today), he remained disadvantages:

- The automation was done task by task.
- Lack of interactivity between applications.
- High cost of machinery.
- Poor machine performance and its impact on developed applications.
- The lack of application maintenance methodology

It was the air of mainframe machines were computers and data were centralized, systems deal with few business functions .Main focus was to automate processes by COBOL. In the 80s, PCs and LANs appeared and desktop tasks made department less linked to IT by the use of word spreadsheets. Since 1990 [8], central control and corporate learning has been a priority for managers with the appearance of Wide Area Networks and relational

databases, no more interest was given to standalone systems. As for the 2000s, Internet enable global enterprises and business partners industries looks for data sharing across efficient systems. The I.S is at the heart of value creation in companies. This is a complex, heterogeneous because often consists of elements that are juxtaposed over time at the discretion of the strategic choices of technological developments of IT systems in place, the development of the organization itself, etc. The need for integration of its various components is currently strongly felt by all organizations. Meanwhile, effectiveness and efficiency improvement is the ongoing concern of business leaders. In a globalizing economy, where competition is increasing, where organizations seek to offer more services to customers, information is increasingly a key strategic variable. It is necessary for decision making. But if the information

raises awareness and reduces uncertainty, the information system, with all its components and in conjunction with other operational resources, enabling the company to meet the needs of different markets, providing in everywhere customized goods and services to a demanding clientele in timely and satisfactory costs. Thus, information is needed within organizations, to act, learn, understand, control and decide

### **B. Information system and decision making**

For the purposes of its business, to inform decisions and to ensure its internal functioning, the company must maintain a certain amount of information. Grouped in the form of a database, it will be used and selectively processed to fulfill legal requirements eg: general accounting) or management (eg inventory management) and decision making (with charts of decision support). The importance of this concept of information system leads us to question first on its mandatory nature as part of this environmental complexity and its importance in the strategic decision making process to eventually develop its role in the mastery of the strategic decision making process appropriate to the complexity.

By studying the information paradox in the company, [9] the information is perceived as a foundation of the decisions .It is thus considered as a strategic vehicle for more importance, that role appears both inside that outside of the company. Inside the company, the information is intended to influence the behavior of members of the company so that they act in accordance with the designated objectives, "so she can increase the synergy of efforts but also destroy the overall result of the efforts." Outside, the information is intended to influence the behavior of actors in a direction favorable to the company: current and potential customers, providers, authorities...

Starting from the fact that the information is a strategic resource and competitive weapon, we note the importance of its role in managing the company / environment

relationship. This role tends to increase with the complexity and mobility environments.

After taking account of the specificities of the environment, the adaptation, survival and evolution of the company, as being a complex system open to many changing environments, require it to be able to perceive the significant information on its external and internal environments, decoding complexity, interpret and anticipate their behavior, act on them to increase their knowledge, possibilities of control and getting answers [10]. Through the study spans of the information system, [11] it is noted that there is a positive role of this system in creating and increasing internal and external transparency to the company.

Considering transparency as a result of communication behaviors, they show following a review of the literature, the information system allows information sharing between individuals and organizations. As for the technology it is created to maintain this just in time in a dynamic way .In this context, the information system is supposed transparency carrier allowing first to facilitate and accelerate decision making and secondly, to communicate between the actors of the business information system.

### III. IT GOVERNANCE

IS governance or IT Governance is defined as the organizational capacity exercised by the executive management and IT management to control the formulation and implementation of the IT strategy in line with the activities of the company [12]. The IT Governance is a sub discipline of Corporate Governance focused on information technology and communication. This discipline, in line with company objectives, focuses on managing risk, optimizing investments and resources to create value and performance of information technology.

One of the most relevant points of the Governance is to align business goals and IS, it is indeed the right balance between governance and management of information technology in the company.

The IT Governance enables direct and control the business processes within the company and this via:  
 -The Strategic direction of the management process,  
 -Business processes use to provide requested services,  
 -The Control the smooth running of the process, their improvements and defining new directions.

In the next section we will propose an empirical study on perception of Moroccan Information systems specificities as far as business decision making is concerned

### IV. EMERICAL STUDY OF MOROCAN IS EFFICENCY FOR DECISION MAKING

#### A. Scope of the study

The information system is nowadays very important for enterprises competitiveness and evolution. Here we target

the Moroccan market, and we studied through a questionnaire about communication and information systems installed in 51 Moroccan companies from different business sectors, the criteria of good IT governance process to implement through the understanding of the Morocco IS specificities for strategic decision making.

#### B. Study hypothesis an methodology

Managers do not have the same approach to govern the information system, and have different criteria to design it. Today, the tendency is an IS to take efficient decision. This verdict affects the choice of the structure of this function within their organization. To validate this hypothesis, we conducted a perception study of IS by Moroccan managers. We realized during the month of March 2016, a study on Information System in Moroccan Organizations.

Organizations of study are 51 valid cases. The study was constructed using analysis method. Were taken into account many criteria

The primary data was collected through a standardized questionnaire.

#### C. Study Analysis

The 51 Enterprises have different activities as shown below:

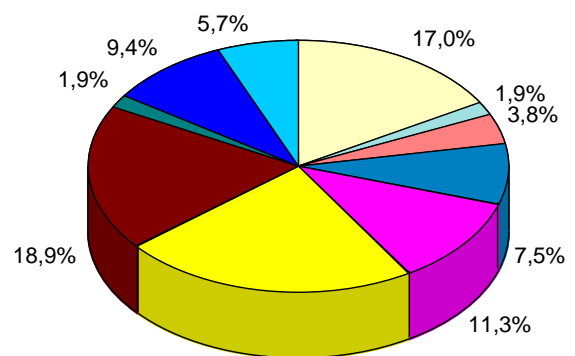


Fig.1: Enterprises Activity domain

■	Agriculture, forestry and fishing
■	Mining industries
■	Manufacturing industry
■	Production and supply of electricity, gas, vapor and airconditioning
■	Production and water distribution, purification, waste management and cleanup
■	Construction (Building, public works)
■	Trade, repair of automobile and motor bicycles
■	Transport and stoning
■	Accommodation and restoration
■	Information and communication
■	Financial activities and of insurance
■	Real estate Activities (Sale, rent)
■	Specialized, scientific and technical activities
■	Activities of administrative departments and support
■	Public administration (Prefecture, municipality, district)
■	Education (primary, secondary, upper, public, private)
■	Human health and social action (Hospitals, private hospitals)
■	Arts, show and creative activities (Music, cinema)

It was noted that the presence of IS direction prevails in the target sample:

IS Existence	number	frequency
Yes	42	81,4%
NO	9	17,6%
TOTAL	51	100%

In addition to that, the IS value is more oriented management of regular business activities, a little less oriented risk minimization, control of business rules and less reducing investment costs. However, the global market, facing competition requires IS other features, such as the exchange of experience, cost optimization, as the management of the business is the bare minimum that can offer. So there is a potential need for improved IT functions for a better strategic alignment tools or establishment to fill IS maturity.

For more detail, we respectively studies the strengths and weaknesses of an IS from its coverage of the company's business processes and subsequently its ability to upload information to make decisions.

Regarding the management of processes, most IS partially manages business processes with a frequency of 45.1%, non-answers with frequency of 17.6% can be interpreted by the confidentiality of the answer for some enterprises or the absence of IS to evaluate.

We cross then this variable of IS management with its estimated strength for potential users:

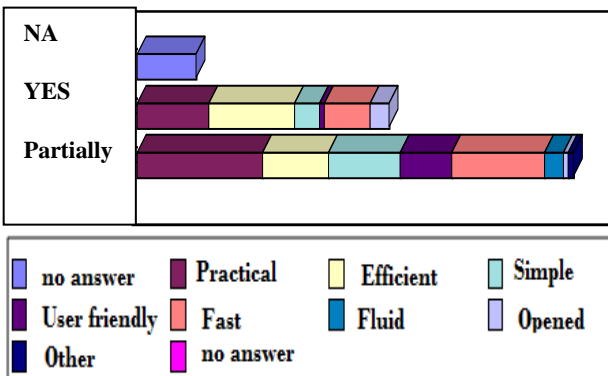


Fig.1: IS Management / IS strength

This meets the maturity concerns expressed earlier. Indeed, the graph above shows that for IS totally managing business departments, the system lacks of fluidity and usability; it is less simple, less practical and slower than a part-coverage system.

We then test the relationship between the advanced processing of business processes and the relevance of the IS to the extent of allowing users to make decisions.

The empirical study returns the following results:

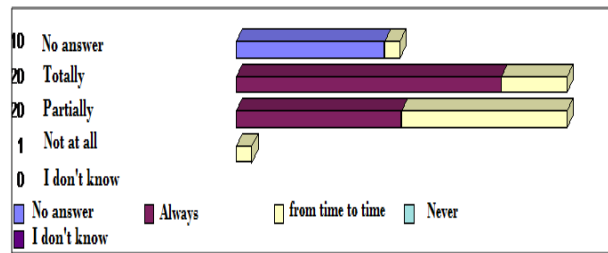


Fig.3: Advanced processing / IS relevance

It is important to note that the coverage of business processes by the IS and its relevance for better decision making are two highly correlated variables for interviewed Moroccan enterprises.

Arguably more business processes are automated from end to end, most we can traced back relevant information to make decisions. To check this finding, let's first assess the strength of IS in relation to its relevance and its coverage of business processes. We establish a multiple factor analysis of these three variables, namely:

- the relevance of the IS
- Advanced treatment of business processes
- IS strengths,

The IS managing totally business processes from end to end (dial C), is efficient and convenient, while an IS that manages them partially is not. Especially the qualities of efficiency, practice and speed are strongly correlated regardless of the system in question (dial D). We also note that the fact that IS can be traced back relevant information is positively correlated with the total business process management, and in most cases he lacks simplicity, usability and a little speed (see Figure 4).

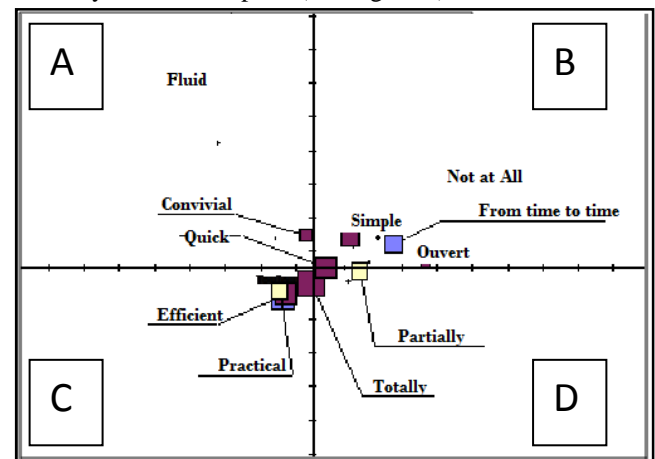


Fig.2: Perception IS relevance, Advanced process and IS powers

Then we evaluate (Figure 5) symmetrically weaknesses of IS in relation to its relevance and coverage of business processes by a second multiple factor analysis of these three variables, namely:

- the relevance of the IS
- Advanced treatment of business processes
- Weakness of IS

Note that IS that manages business processes fully, and that enable decisions' making is rather complicated and slow. Other problems arise namely, limiting and saturation which are both related and inversely correlated with the complexity and slowness.

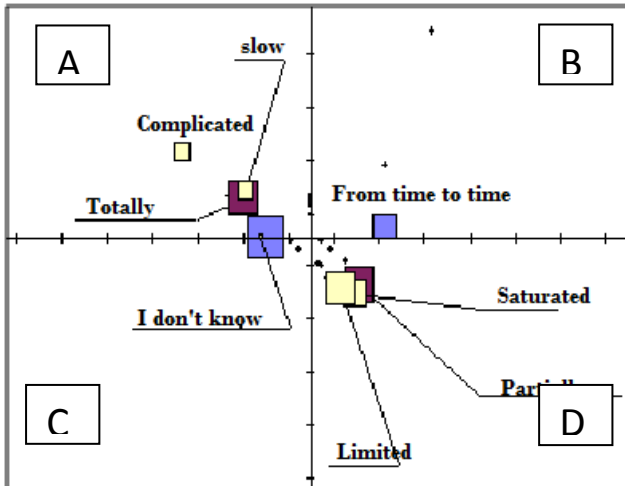


Fig. 3: Perception IS relevance, advanced processes and IS weakness

We deduce that IS covering all of the company's business processes and making relevant decisions is necessarily efficient and practical, yet lacks usability, speed and ease of use.

One last point mentioned in this study, it is the total process management with the activities supported by the IS and possible weaknesses ( Figure 6): the graph below shows that the management of business processes from end to end is correlated with the management of business activities and the realization of daily tasks, it is not correlated with the accumulation of experience and risk minimization. Besides this type of IS is rather complicated in this case and limited in the case of a partial management. This one shows the limitation of horizons of decision making through actual Moroccan IS and the need for more detail and greater performance for better results.

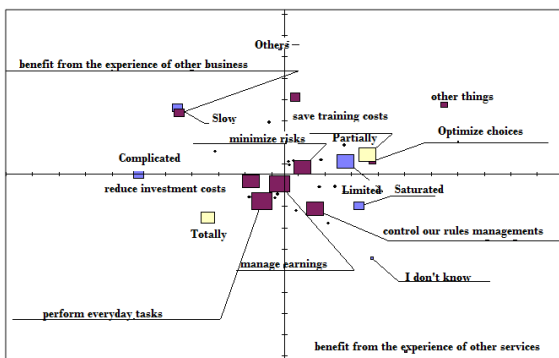


Fig.6: Perception of total process management activities supported by the IS and IS weakness

V. IT GVERNANCE PROPOSED MODEL

From the investigation, and to address the limitations of existing SI proposes a governance model to:

- Evaluate all the company's business processes
- Understanding the constraints of all stakeholders about the processes and objectives,
- Measure the performance of process execution
- Simplify the reading of the direct results and deducted
- Run as soon as possible
- Adapt to business and environmental changes,

Such a model, will fill IS gaps in Morocco from a strategic nature and will increase their profit.

The table below shows the projection of these features on the potential actors and tools to deploy:

Model functions	Actors	Tools
Evaluate all the company's business processes	• Business Process Manager • DSI	internal / external audit Team meeting Formalization of processes
Understanding the constraints of all stakeholders on the processes and objectives,	Head office business management DSI internal control (if available)	- Managers Meetings -Management Of daily incidents -Meetings regular trades teams to move up the job management problems.
Measure the performance of process execution	Head office business management DSI	- Dashboard Edition -Comparison Results with expectations -Comparison With competition.
Simplify the reading of the direct results and deducted	DSI	-outils technologiques -veille techniques (rapidité, convivialité, ease use and exchange
Support the delivery process as soon as possible	ISM Head of the office	Objectifs stratégiques urgents
Adapt to business and environmental changes,	DSI Head office external actors	Outils techniques Objectifs stratégiques urgents

Such a model will fill gaps in Morocco SI strategic in nature and increase their profit. It opens the door to other specifications executive order detailing the other dependent

variables of human and material resources, industry or internal organization.

## VI. CONCLUSION

In this article, we propose an IT Governance Model for Moroccan enterprises from an empirical study on perception of IS efficiency for business decision making. After an introduction about Moroccan ICT and its evolution, we first briefly expose a state of art of Information Systems in general, and their uses for business decision making. We define IT Governance and present the study. Then we conclude an IT Governance model correcting eventual limitation.

To conclude, strategic alignment must be considered in the establishment of an IS or its improvement, appearance assured by the quality of information required of the IS and its relevance for better decision making. It must also visualize permanently the business processes and analyze while checking a quality system criteria. (Practice, efficiency, usability, simplicity, and speed).

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