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Urbanization of Information Systems as a Trigger for enhancing Agility: A State in The Tunisian Firms

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Abstract

Nowadays, the information Systems (IS) became one of the main assets of modern corporations, but it faces many problems. Among the most important are low productivity and a large number of failures like obsolescence, heavier, slower and complexity of applications integration. The problem of low productivity of IS was the product of the software crisis, as indicated by the delayed development and implementation of ISs and accumulation which leads to maintenance problems. Requests for new or improved version of the IS have grown faster than the ability of the Chief Information Officer (CIO) to develop the existing IS. Some reasons are: the increase in the cost of software development and the IT choices of the CIO. All the above problems are further exacerbated by the growing complexity and size of software products. The IS is obliged to overcome these difficulties and ensure its evolution. To do this, urbanization is a framework that aims to simplify the IS, to improve communication between its components and to ensure its evolution. In an exploratory approach, this study examines the concept of urbanization studying its impact on the IS to ascertain agility. This was done in order to ascertain the evolution of IS and guarantee the agility facing the environment turbulence. The general assertion is that the Urbanized Information Systems (UIS) changes a firm vision because its procure flexibility, reactivity and interoperability of UIS. The originality of this paper is to explore IS urbanization considered as a French framework of Enterprise Architecture (EA), this study is an empirical validation of the agility of UIS.

Keywords Information Systems**,** Urbanization, Enterprise Architecture (EA), flexibility, Agility

1. Introduction

In the current economic context, firms need to be constantly re-engineered to reply changing market demand and technological evolution. So, the field of IS has evolved along with the development of Information Technology (IT) and applications over the time. Last years, the concept of urbanization is used and transferred to the implementation of IS within an organization. The metaphor of the city and more specifically the vocabulary, rules and principles of the urbanism of towns has been widely used in the IT systems field because of the similarity of the initial issues: how to overhaul, modernize and judiciously profit from technological advances without erasing the past, within the cost limits set, and do so while continuing live in the city while the work is carried out (Longépé, 2009).

- How to perform and modernize the IS.
- How to take advantage of technological advances without having to wipe the slate clean, controlling costs and maintaining life in the system during construction.

Urbanization of IS is a French framework of Enterprise Architecture (EA). The concept represents the constructing or reconstructing of IS based on permanent components. It consists to move from an existing IT system to a target IT one by successive stages corresponding to the several steps unlike replacing the existing IT system with another in one time. It is considered like a less radical approach. Once this has been successfully completed, the IT system has the capacity to receive any new structure which meets the established urbanism rules. Modifications made to be parts of the IT system will have an impact which is both predictable and controlled. This approach takes account the most important development requirement of IS and maximizes the safety of the information pool. It is a necessary evolution in a Firm. The role of CIO is to support the business vision in an ever-changing approach to align the IS with the business strategy (Levasseur, 2002). Thus, the urbanization paradigm focuses on IS and certainly on business axis on which the possible transformation of business processes will be studied (Levasseur, 2002).

Some Firms find advantageous implementation of the urbanization. Many are those who have already done in France and in the world, like Air France KLM, Renault, Bnp Paris, etc. These Firms bring several organizational and financial benefits, including improved decision making, improved adaptability to changing demands or market conditions, elimination of inefficient and redundant processes, optimization of the use of organizational assets, minimization of employee turnover, increasingly recognize the tremendous potential for value-creating synergy by linking the different components and actor of organization. In this paper, our goal was to analyze empirically the state of urbanization in Tunisia and verify the agility of IS. This study would add to the small number of empirical studies on urbanization paradigm.

Instead, this paper proceeds with theoretical background section whereby the key constructs of the study and context of research and hypothesis are developed. The methodology section describes the procedures used for data collection and the tests were conducted with the proposal models. The first model is represents the urbanization stages that take into account all the steps and passages necessary to urbanize an IS. The second is a research model to provide an overview of the state to be a Tunisian Firm in urbanization and present the main attributes of the IS in fact. The results are reported in the findings section.

2. Urbanization paradigm

In this paper, we will outline the different meanings attributed to the urbanization of IS. Indeed, this concept has been studied earlier by both the French-speaking world than in the Anglo-Saxon world. We will try to compare the two definitions.

2.1 French Definition

According to the Petit Larousse, urbanism is "*the science and technique of construction and planning of cities, towns and villages*." By analogy, Longépé (2009) defines urbanism as "*the science and technique of construction and development of IS"*. Urbanization enables:

- Federating the building blocks of an existing IT system around a whole architecture and following principles which will allow it to acquire the flexibility and reactivity necessary for it to be adapted to the constraints of the market or the environment.
- Managing the rapid and efficient taking into account by the thus "urbanized" IT system of critical development demands, using a rationalized approach.
- Concentrating development efforts on the new high added value functions and reusing, for the most, the existing system

Once the IS is urbanized, it has the capacity to accommodate any new structure that meets the established planning rules, amendments to part of the IS will be overcome. We can identify that the purpose of urbanization is to predict, organize and manage the needs of the business developments while minimizing risks and maximizing the preservation of heritage. In continuity, urbanize an IS for Jean (Jean, 2000) is "*simplified. It will be with anticipation, and a breakdown of the main principles of construction which will help development of the IS and computing at the same rate as the strategy and organization*. *The metaphor of the city is the best way to understand urbanization"*. Even more, urbanize an IS is the ability to organize and continue the gradual transformation of the IS while having the goal to simplify, optimize its value and make it more dynamic, agile, responsive and flexible the strategic developments of the business while relying on the technological opportunities (Club Urba SI, 2003).

The urbanization is the process that makes an IS more suitable to serve the corporate strategy and anticipate changes in business environment (Cigref, 2003). Thus, it makes the computer a tool of corporate strategy. Behind this purpose, there is a need for a flexible and agile IT infrastructure in order to take into account gradually, according to the priorities of senior management, the demands of managers.

Through this study, first, we should keep in mind that urbanization is an effective and relevant process. Secondly, it addresses or traits the complexity of the Firm, its inconsistencies, its redundancy and its duplication. Thirdly, this is a global vision needed to understand the challenges of adapting the IS complex environment. Fourthly, this approach can control the evolution of IS with the strategy of the Firm and its business needs. Fifth, it can anticipate the development needs of the IS to focus on projects in a timely manner to ensure scalability, sustaining change and control the impact of this change on the existing. Finally, it increases the coherence of the SI and can align the business strategy, identify the advantages to reduce costs such as a computer reuse, significantly reduced maintenance and risk reduction on the IS.

2.2 Definition Anglo-Saxon

According to Zachman (1987; 2002) Enterprise architecture *is " a major view to organizational missions and functions, working processes, existing information, relational net, order of work performing which has the aim of making the data systems solid and efficient."* And *"is a collection giving descriptive models about describing an organization in a way in which it can be in accordance with the established management requirements and be suitable and maintainable"*. It is also "*a base of strategy informational possessions which includes business mission, necessary data and technology needed to perform those missions and processes to serve modern technologies in replying to variable requirements of the mission'* (Council, 1999). Peristeras et al, 2001 has proposed an alternative definition is "*an EA is a structured knowledge base for engineering and enterprise integration, knowledge that include the analysis and description of business, design and development project engineering and operation of the Firm*". This concept "*includes processes, mediums and necessary constructions to use informational technology solidly and harmoniously in the domain of organization to protect operations of the organization cycle in the present and in the future"* (Kaisler, Armour, & Valivullah, 2005). It should be *'organized in a way that supports reasoning about the structure, properties and behavior of the system.* Also the EA "*defines the components that make up the overall system and provides a blueprint from which the system can be developed"* (Chen, Doumeingts, & Vernadat, 2008). EA face the same problem that deals with the urbanization of IS. It represents the global modeling of all enterprise resources (Club Urba-EA, 2006) such as actors, processes, applications and technical architectures. The EA has been operational since 1996.This work has been pushed by the U.S. government administrations.

The distinction between EA and urbanization is characterized by a different description levels or layer or vision. The process of EA is analytical relatively concentrate on the design of IS while urbanization is a process concerned with intermediate levels but not the strategy. In sum, EA approach generalizes that of the IS urbanization across all activities and business processes. Generally, the approach of the EA does not provide enough documentation to verify the consistency of different models.

The approach of urbanization SI differs from the approach of the EA. It is based on only five models (strategy, business processes, functions, IS and IT systems).This clarify the process, reduce the risk of rejection of urbanization from firms entities and facilitate linkages between management model. Apart from some differences between the EA and urbanization such that the distinction in visions and layers, integrating the two approaches within the company and the problem of maintaining strategic alignment in time. The failure to ensure strategic alignment might affect the process of EA. On this basis the process of urbanization demonstrates an ability to effectively lead a process of revision of IS since it addresses only one part of the IS;

3. Information Systems Agility

The IS agility represents a continuity of organizational agility, it is considered as a subject of recent research interesting academics and practitioners (Sambamurthy, Wei, Lim, & Lee, 2007) and is considered as an important topic among IS literature (Luftman & McLean, 2004). According to Hobbs and Scheepers (2010), agility is the capability to quickly sense and respond to environmental perturbations. Agility in IS literature is considered a creator of strategic value to Firms with the role of IT as a viewer platform for agility (Sambamurthy, Bharadwaj, & Grover, 2003). Likewise, this concept as we have defined it is the recognition of a business environment that changes faster than conventional planning cycles of the company, hence the need to respond through the existing IS and the readiness of the organization to perform the detection and response to these changes (Luftman & McLean, 2004).

The agility is defined also as the ability of the business processes of Firms to do with speed, precision and lower operating costs in the opportunities for innovation and competitive action (Sambamurthy, Bharadwaj, & Grover, 2003). Management must have the ability to reshape and reconfigure the individual components of business processes by combining individual tasks and capabilities in response to their environment. Thus, the top management of the organization can change either by the addition or deletion of new processes to take advantage and exploit dynamic environmental conditions is improved by interconnecting clients and suppliers (Raschke., 2010). Agility is the optimization of partnership relations with suppliers. For example, the Ford Motor Company was able to connect the warranty information for customers with suppliers to help improve future products (Teresko, 1999).

Organizational agility and IS agility are closely related. Overby et al. (2006) recognize agile Firms like those that hold the detection of competitive potential action in their environment and to mobilize their assets to get hold of

opportunities. Indeed, changes detection in the business environment requires the ability to early exploration and business processes to detect quickly, risk and startup costs. Therefore, the operating capacity allows to adapt the IS targets processes to reduce costs and risks and improve the quality of services rendered. Thus, business agility depends on the quality of SI and its ability to adapt to the turbulent environment.

IS literature has focused on the quality of agility depth action was developed to study the relationship between agility and IT. Hobbs and Scheepers (2010) study identified the gaps between theory and practice perspective on agility IS. For theoretical perspectives, researchers talked of a new era where performance of a company depends on the agility of IS (Overby, Bharadwaj, & Sambamurthy, 2006). Dependence occurs in three factors. The first factor is the capacity of the operation of the IT function resulting from the fusion of individual knowledge and crafts. The second factor is the reusability of the IT infrastructure. The final factor focuses on the effective use of the process (Hobbs & Scheepers, 2010). In addition, Fink and Neumann (2007) have shown that personal computer capabilities positively affect the use of technology and infrastructure which proves organizational agility. We retain the final factor that emphasizes the enterprise architecture in our case urbanization of the IS by combining business, functional, applicative and technical infrastructures of the IS.

3. Research Context

Today in a complex business environment, Firms have great difficulty responding to change and evolve. Part of this difficulty is due to a lack of internal understanding of the complex structure and components of IS, where legacy information about the business is locked away in the minds of specific employees or business units. The urbanization paradigm review of literature suggests the IS evolution design. In the last twenty years, IS are increasingly developed. This development manages the evolution of business process becoming the change levers within the company. Thus, urbanization is a proactive business tool and can be employed to model for a company existing functions, elements and processes in order to manage business change and provides new organizational practices. Added to that, it makes possible technological change allowing the firm to be in continuous development. Consequently, IS and its components are constantly evolving and enable cohabitation between the different technological solutions.

The firm's strategy is affected by technological, economic and globalization changes which makes its IS more complex. To confirm its place in the turbulent environment characterized by rapid change, it must have quickly adapt its strategy and lead to significant changes in politics at all levels in order to align it on the strategy. The IS is an art should always be flexible (Imache, Izza, & Ahmed-Nacer, 2012). Thus, the agility of the IS can be considered as a priority objective of the company. Some Firms invest in the development of there IS by acquiring new technological solutions, hardware and software systems. These investments may not be adapted to the evolution of IS and they become amalgamated. Make a clean sweep of the existing IS on the base of a new solution homogenous and modern doesn't seem to be the best solution either functionally or economically nor humanly (Longépé, 2001). It would lead to a similar scenario after a few years. However, this solution is very costly. Hence, urbanization offers a comprehensive framework of IS that supports the entire company and which must help both business managers as IT professionals.

Indeed, the framework of urbanization provides having a broad and complete vision of the IS. If urbanization is well realized done, it helps to obtain a structured, scalable, efficient and flexible IS and promotes understanding and anticipating changes added to that creating value. Also, urbanization must guarantee the IS coherence and evolution that integrates the organizational, technology and business changes. Also, it facilitates the development and migration to other platforms without compromising the existing, based on opportunities. Consequently, this framework can make the agile system to ensure its scalability, responsiveness, consistency and reusability of components and enhances the reliability of information shared between the actors of IS.

According to the dynamic and complex environment, Firms must review their IS. Through urbanization, firms are seeking for competitiveness. Effectively, firms are touched by decreasing of their market share because their IS are not flexible to support new products, new services and customer's needs. As an alternative, Firms have to adopt new architectures in response to new business strategies to cope environment problems. In this way, they probably will be competitive. Urbanization may be regarded as one of the key to achieve competitive advantage through IT. IS of International firm are already urbanized since the beginning of this decade which gives them the opportunity to grow in turbulence. This framework provides architectural views that support the communication between different components and facilitate management. It offers also a tool for benefits assessment, analyses of alternatives and risks;

finally, it highlights opportunities for building greater quality and flexibility into applications without increasing cost.

From this point, we want to achieve an overview of the IS urbanization in the Tunisian context and even perceive the urbanization capacity architecture to lead to the agility. This question will allow us to gain insight on the evolution of managerial practices and maturity of Tunisian Firms in this area.

3.1 Research model

This model is developed through reading the various steps involved in the urbanization of an IS (Club Urba SI, 2003; Longépé, 2009) and it give us a methodological framework to follow in the urbanization of IS. The main function of urbanization process is auditing the **existing system**. This step is used to inventory existing IT functions, information flows maintained between these different components, and finally, identification of business processes already supported by IS. This is the step of IS cartography, which is divided into three parts: functional, applicative and infrastructure (Covering databases, networks and technical components). The objective of the applicative cartography is to achieve a graphical representation of existing IT system, observing a set of bricks, and their links. It consists to identify and collect existing IT systems, products that describe the enterprise as it exists today and as it is intended to look and operate in the future. This step represents an initial working basis for **defining a target IS**. It is the set of products that portray the future or end-state enterprise, generally captured in the organizations strategic thinking and plans, commonly referred to as To-Be (CTO, 2001). It represents also the business vision and IT strategies, as expressed in business strategies and visions. The target must be able to serve the strategy and business process within an IS aligned with corporate strategy. Thus, analysis of existing IS helps to set the objectives and strategy of the target. At this level, it is often advisable to construct a framework of urbanization that will define the rules of **construction or building** of IS in which anticipate changes and don't reproduce the same defects of the old systems. Similarly, **convergence plan phase** is also fundamental. It helps to refine the scenario of convergence to the target already realized in the last two iterations (Longépé, 2002). The objective of this step is to show how to make transition from the current state of IS to the goals and conditions expressed by the target. Evolving the enterprise from its existing to the target system needs multiple actions and incremental builds. To control and follow this process, a roadmap that provides a step by step transition from the existing system to the target one, must be developed and maintained.

The research model presents the different phases and stages of the urbanization process. Through it, we have an idea of the final states of IS. It reproduces the same steps previously announced in the framework of urbanization as showed in the figure 1.

Figure 1: Model of research

3.2 The research hypotheses:

The research hypotheses are developed as follows.

H1: an Urbanized IS (UIS) must brows all stages outlined in the model of urbanization.

H1.1: IUS is scalable.

H1.2: an IUS is interoperable.

H1.3: an IUS is flexible

H2: The urbanization of IS leads company to the agility.

Hypothesis 1 helps to qualify the Urbanized IS (UIS) if it passed by the steps already seen in the model (pattern) of urbanization such as the strategic reviews axis, analyze the existing IS, define the target IS and the convergence plan finally prepare IS to the transition to urbanization.

Hypothesis 1.1 assumes that the urbanization is the engine of evolution in a business (Bonne, 2002; Longépé, 2009). Today's the effective management and exploitation of information is the key to business success, and the indispensable means to achieving competitive advantage. Urbanization addresses the need of evolution of IS by providing a strategic context for the evolution of the system in response to the constantly changing needs of the business environment.

Hypothesis 1.2 determines whether the interoperability of UIS. According to (Jamison, Layman, Niska, & Whitney, 2005) interoperability "is the connectivity of two systems to flow information freely from one to another and back again". Indeed, interoperability is characterized by the ability of independent systems to work together with minimal effort (Konstantas et al, 2005). We address the importance of urbanization to ensure interoperability. It facilitates the identification of key information exchange requirements for critical command.

Hypothesis 1.3 examines whether the UIS is flexible. Urbanization is essential to describe complex IS and to develop standards that enable business competitiveness and flexibility. It helps the analysts and developers of systems to see, analyze, control and align the IT landscape with the business to guide competitive transformation. It also extends developing business processes and IT infrastructure, toward developing information capabilities for optimizing business flexibility and business standardization.

Hypothesis 2 inspects the agility of UIS. The IS agility has received a lot of attention recently. Organizations need to act and perform in increasingly dynamic environments. There is a need for clarity on fundamental issues such as what it entails and what makes it agile. The Current hypothesis aims to prove that UIS lead the agility. We show that the concept of UIS is sufficed to address the challenge of agility.

4. Research design

Research methods are at the basis of the production of knowledge in any given field (Pinsonneault & Kraemer, 1993). According to Benbasat and Weber (1996) "*shapes the language we use to describe the world, and language shapes how we think about the world"*. In order to determine whether methodology use by this research we evocates the existence research posture specific to IS. The followed research is exploratory referred to a positivism posture. The description of the term positivism is consistent with its usage among information systems researchers including (Orlikowski & Baroudi, 1991; Dubé & Paré, 2003; Weber, 2004; Lee & Hubona, 2009).We choose positivism because "*is familiar to a majority of information systems researchers, it is useful as a starting point for illustrating the logic of the MPMT framework […] it involves statistical inference and multivariate analysis, in the form of statistical behavioral research, provides a wealth of theories whose formative validity has been established"* (Lee & Hubona, 2009). To operationalize and validate the above model, we use a quantitative method to explore the urbanization of IS process in Tunisian Firms through a survey study. This approach has a good level of realism when the study deals with a situation of real consumption (Tabachnick & Fidell, 2007). The survey is qualitative. Its purpose is to identify the a-priori salient dimensions and measures for the state of urbanization and the quality of this process in Tunisian Firms of the study conceptual model. The purpose of this part is threefold, firstly, to present data collection tools and methods of analyze; secondly, to expose results founds variables and data collection tool and finally to outline the methods used for data analysis.

4.1 Measurement and data collection

A survey was conducted among a large population of 35 Tunisian Firms listed in the Directory of the Tunisian Union of Industry, Commerce and Handicrafts (TUICH). The broadcast of survey yielded 35 responses. 30 surveys were selected and 5 were eliminated because they are incomplete. The final response rate was 85%. It is considered quite acceptable given that response rates to such surveys typically range between 15% and 20%. This rate indicates the interest to the subject.

These firms were selected on the basis of certain criteria such as size (size of 250 individuals and over), turnover (more than 300MD), the sector of activity and their locations. All questionnaires were completed by the CIO. The respondents are able to provide a meaningful assessment of the status of their information with all contingencies change; they provide us necessary and accurate information to the study.

5. Data analysis

In this section we will discuss the results of statistical analysis determined in the previous section. Indeed, these tests have led to two types of results. Descriptive statistics are used to describe the basic features of data and provide simple summaries about the sample and the measures, and the second model validation and testing research hypotheses.

5.1 Hypothesis validation

Firstly, we carried out the distribution of frequencies. This operation gave us an overview of the IS urbanization rate in Tunisia. Indeed, 66.7% of Firms have conducted an urbanization rate of 33.3% for businesses that have neither

studied nor implemented. Results are showed in the table 1.

Table 1: The state of urbanization IS

This rate allows concluding that the Tunisian Firms are in the process of generalization of this practice. They recognized the importance of this process for the survival of the company in a competitive environment, it is very important to the economic opening to the outside world and the globalization of national markets. Indeed, this practice enables Firms to enroll in a dynamic, successful and global transformation progressively. To achieve this objective, urbanization is the essential element.

Table 2 : Obstacles of IS urbanization

Several reasons prompted the 33.3% of Firms that don't urbanize there IS, they are mentioned in Table 2. The main reason to forbear is the absence and the unavailability of skilled labor 16.6%. Indeed, the process of urbanization is considered like a new design of IS by exploiting new technological opportunities and tools and it is need high and specific qualification. The second reason is the financial difficulties, indicated that such a project needs to have a substantial budget to support the cost of acquisitions and changes.

This study showed that urbanization is an integral part of the strategy with a rate of 66.7%. It is a conscious decision for the long term to manage technological change and complexity of the environment and it provides a framework in which firms make conscious decisions about IT. The decision of urbanization is a joint decision between the General Manager (GM) and the CIO. It is often taken by the GM, with collaboration and orchestration of CIO. In order to urbanize the IS, the CIO take into account many ways to document and to inform this process. Indeed, they supports the urbanization process by several means such as a review literature and scientific publications 54.8%, the meeting and conference 43.3%, external consultants and competitors 56.7%.

In other subject, the realization of this process by outsourcing has shown 43.3%. Thus, we recognize, the era of outsourcing IT in business in Tunisia. In reality, outsourcing helps Firms to implement the urbanization; it improves business processes and organization performance in the future (Ross & Beath, 2006). Therefore, it can reduce expenses for the company. Many reasons push organization to outsource this process. Firstly, it looks to be more sophisticated than cost reduction. For some, the new outsourcing strategy benefits from the lower unit costs available with a cheaper cost base. Secondly, outsourcing reduces the dependence between business and keys employers and aid to keep secure organizational knowledge from threat of employees and develop tools and methods for knowledge capture and dissemination. Thirdly, the main important advantage of outsourcing is a core competence of outsourcers transferred from old experiences.

The survey results showed that the process of urbanization can successfully manage the company's business by showing the rate of 63.3%. In fact, urbanization is the reorganization and restructuring of the IS. It considered like is the way to understand and manage the complexity of organization. It connects, in the same time, the business strategy and IT needs of an organization into a cohesive and dynamic blueprint, providing key capabilities for managing the impact of business-driven change. It also helps to manage and control the evolution of business processes and technology to ensure a good traffic information flow. Due to the IS division provided by urbanization, All IS levels is divided on subsets like zones, districts and plots. This division serves to make easy the maintenance when there are problems.

In this part of study, we had to test hypotheses and determine independence between the research variables. For this reasons, we used the Chi Square test and bivariate analysis.

For the first hypothesis:

To determine the independence or dependence degree between variables, we used the Chi 2 test on the 2 nominal research variables: urbanization of IS and planning. Thus, the test rejects the null hypothesis H0 and accepts the research hypothesis. We classify an UIS if and only if we run through all the steps in the model search we mention the strategic review, analysis of the existing definition of the target, the convergence plan and finally the transition to urbanization. Otherwise, the IS is not urbanized. However, some Firms have begun this project but they have not come to terms so we call them ISN. The test we performed showed the following results in Table 3.

Table 3: Chi square test of H1

The hypothesis H1.1: the UIS is evolving

The second research hypothesis explores the evolution of UIS and it was accepted. There is a relationship of dependency between the two research variables: urbanization and evolution of IS. The results viewed in the table 4 improve that the correlation between the two variables are in the order of 0,933 is very acceptable and which identifies a strong relationship between urbanization and the evolution of IS. In addition, Sig (2-Tailed) value which is 0.000, we can conclude that there is statistically significant correlation between urbanization and evolution of IS. That is, increases or decreases in urbanization do significantly relate to increases or decreases in competitive evolution of IS. We conclude that UIS is evolving.

Table 4: Chi Square test of H1.1

The results obtained confirm the theoretical contributions of the concept of urbanization. Indeed, it manages comprehensively the IS evolution and it can handle the problems related to the evolution of organizations (Club Urba SI, 2003). The main objective is to organize the development needs in a reactive, efficient and effective of IS, by minimizing risks and maximizing the protection of information assets (Morley, Hugues, Leblanc, & Hugues, 2007; Longépé, 2009). Added to that, urbanization can structure and to put rhythm the IS evolution at the same rate as the organization's strategy and manage the gradual and continuous IS transformation (Bonne, 2002; Longépé, 2009). In conclusion, it is a means of improving the ability of IS to evolve consistently with changes in business strategy.

The hypothesis 1.2: UIS is interoperable

To test this hypothesis, we proceeded as previously seen. The result showed table 5 present a strong relationship between the two research variables: Judgment of the urbanization process and IS interoperability. In addition, Sig (2-Tailed) value which is 0.000, we can conclude that there is statistically significant correlation between urbanization and interoperability. That is, increases or decreases in urbanization do significantly relate to increases or decreases the interoperability of IS.

Table 5: Chi Square test of H1.2

Interoperability is the transition from strategically to technological phase. According to Chen et al, (2008) interoperability "*is the ability for two systems to understand one another and to use functionality of one another. The word "inter-operate" implies that one system performs an operation for another system*". Precisely, it "is *the ability of information systems and the business processes they support, to exchange data and enable sharing of* information" (Papazoglou & Georgakopoulos, 2003). The results showed in the Table 6 confirm that urbanization leads to IS interoperability. Technically, in UIS interoperable is to demonstrate the faculty for two heterogeneous computer systems to function jointly and to give access to their resources in a reciprocal way (Chen, Doumeingts, & Vernadat, 2008). Indeed, exchanges with internal and external partners, suppliers and customers require the company to implement an interoperable IS. UIS Interoperability enables to IS users the ability to accomplish their business rapidly. Interoperability is considered a key issue and it was a principle in the conception and deployment of UIS. Also, consolidating existing architectures also provides a vehicle to highlight potential interoperability shortfalls within the enterprise. So from the result obtained, we can conclude that the SIU is interoperable. Thus, applications are able to cooperate among themselves and with business partners.

The hypothesis 1.3: The UIS is flexible

The four hypothesis tested determines the relationship existing between the UIS and IS flexibility. The results obtained from chi 2 test implicated on the two variables: urbanization of IS and the flexibility is to reject the null hypothesis and determine a strong correlation between these two variables as shown in Table 6. Indeed, urbanization can bring the flexibility, anticipated, and relevant response to business needs. It also improves the adaptability, flexibility, adaptability; responsiveness of SI overlooked strategic developments of the company (Bonne, 2002; Club Urba SI, 2003). In addition, Sig (2-Tailed) value which is 0.000, we can conclude that there is statistically significant correlation between urbanization and flexibility. That is, increases or decreases in urbanization do significantly relate to increases or decreases the interoperability of IS.

Table 6: Chi Square test of H1.3

We've gone from the era of monolithic architecture to the urbanized technical architecture. It is scalable, modular,

flexible and interoperable through the use of Service Oriented Architectures (SOA). It becomes recently popular and potentially very useful in the management, business and engineering worlds as the enterprise-focused Information Technology (IT) architecture of choice (Andary & Sage, 2010). SOA is also a means to leverage flexibility and agility to system services as it offers a hierarchical framework to coordinate simultaneous business process design and implementations using loosely coupled service infrastructures (Ren & Lyytinen, 2008). Indeed, it is likely flexible and facilitates the development of components such as services, without a strong impact on other services: integration principles to orchestrate services clearly identified external and interoperate with various technologies, and with the existing assets, facilitating the migration and coexistence " (Mandel, 2009). SOA's core principles: scalability, agility, and reusability, have been the focus of IT development for some time. Furthermore, a rapidly evolution of enterprise landscapes, the ability to adapt to changing business needs is more crucial than ever. SOA is not only able to facilitate this but also allows organization to standardize and unify processes and align IT architecture with business drivers. Even, SOA is the architectural response to business agility requirements. SOA benefits to the business are in the ability to introduce products to market faster, enable business transformation, and lower maintenance costs. We conclude that SOA represents the implementation of the principle of urbanization in the business. It is designed to meet the demands of evolution even the urbanization of IS.

The second hypothesis 2: The UIS leads to Agility

The four hypothesis tested determines the relationship existing between the UIS and the agility. The results obtained from chi 2 test implicated on the two variables: urbanization of IS and the agility is to reject the null hypothesis and determine a strong correlation between these two variables as shown in Table 7. In addition, Sig (2-Tailed) value which is 0.000, we can conclude that there is statistically significant correlation between urbanization and agility. That is, increases or decreases in urbanization do significantly relate to increases or decreases in the agility. Indeed, urbanization can bring the flexibility, anticipated, and relevant response to business needs. It also improves the adaptability, flexibility and responsiveness of SI overlooked strategic developments of the company.

Table 7: chi Square test of H2

Urbanization paradigm offer an overview of how organizations can structure there is. It is provide an architectural description enhances agility (Strohmaier & Lindstaedt, 2005; Goethals, Snoeck, Lemahieu, & Vandenbulcke, 2006; Imache, Izza, & Ahmed-Nacer, 2012) and considered like an account of the law of requisite variety in the context of the IT function, namely a model can be less complex than the process of exploitation, but it must be the requisite variety to control the process (Ashby & Conan, 1970).

Previously, we demonstrated that the SIU is perfectly flexible and interoperable. These two qualities prove that this system constitutes the foundation of an agile IS able to cope with the turbulence of the environment. Therefore, agility proclaims the flexibility that provides the ability to respond quickly and efficiently to changing customer and consumer demands and the interoperability that captures the dynamism of the different components of IS and exchanges information quickly, it can be seen as one important property of agility. Furthermore, agility can be considered as a non linear function of interoperability (Imache, Izza, & Ahmed-Nacer, 2012). Therefore, all of flexibility and interoperability offer an innovative response to an unpredictable change on groups of systems to deal with high rates of change (Goldman, Nagel, & Preiss, 1995; Ramasesh, Kulkarni, & Jayakumar, 2001; Conboy & G, 2004). Hence, we can retain that urbanization of IS leads to agility and makes it the best suited to serve the strategy and anticipates changes in the business environment. This research affirms that business agility and agility of information systems exist and agile information system enables agility the company (Hobbs & Scheepers, 2010).

The agility depends on the response of IS to the requirements of customers, suppliers, users. The scalability, agility and reusability formed the current improvement of IS development for the past two decades (Ren & Lyytinen, 2008). In the context of IS urbanization, strategic alignment becomes growing concern for businesses. This question is downstream of the redesign of the SI. However, it is a necessity in the IS urbanization process. For this, the UIS must be aligned on the business strategy to provide the flexibility, responsiveness and agility required to respond to environment variations.

6. Findings

The objective of this paper is to examine the state of urbanization of IS in Tunisian company and verify the agility of UIS. This was done in order to ascertain the evolution of IS and guarantee the agility facing the environment

turbulence. The general assertion is that the UIS changes a company vision because its flexibility, its reactivity and finally its interoperability.

Reduce and control operating costs

Improve the firm's results

Improve business process

Helps in sharing risks, among others, UIS leads to agility and makes it the best suited to serve the strategy and anticipates changes in the business environment. This research affirms that business agility and agility of IS combined enables the agility of UIS.

7. Conclusion

Urbanization paradigm has greatly evolved since the last decade. The objective of paradigm was to deal with a number of organizational and IS issues such as, IS rigidity and complexity, poor communication between stakeholders, lack of interoperability of IS, or difficulty to develop a comprehensive vision of the whole organization. It improves business alignment, prepares road maps towards the IS evolution process by valuing each steps in modeling of IS and managing projects portfolio.

While the urbanization of IS is a recent field of research, this article provides minor theoretical and practical contributions. Theoretically, it provides two adapted models. The first is to conduct an urbanization project and the second is to study the agility of UIS. This paper was two main research questions the state urbanization project in Tunisia and how UIS leaded to the agility. This work applied survey method. The results found improves that the majority of Tunisian firms are within the urbanization process about. Conscientious about the importance and emergence of this project will enable Firms to become more competitive and profitable through qualities improved empirically in this research: interoperability, flexibility and the IS evolution. It deals with the demands of customers, competition and technological changes. Hence, urbanization improves also business agility although IS agility. Agility is regarded as a response to the changing complexity of firms. Finally, it provides software infrastructure essentially borrowing principles that were originally pioneered among software developers to overcome the islands of IT infrastructure that plague IT management. These findings would enable us to identify the most important and appropriate quality UIS is agility.

However, this study has several weaknesses. First, the sample size of the study was limited to only private firms in Tunisia. The generalizability of the findings may be limited as the sample size compared to the overall population, including the SME in other study. Second, the number of variables employed in this study is also limited to the agility, flexibility, interoperability; next study should investigate on the evaluation of UIS, for example.

Based on this limitation, we would like to propose refinements to future research. First, instead of using Chi square test, perhaps future research should consider the dominance of analysis and causal approach. This approach permits to study in depth inferences of relations and allow us to predict the level of influence between variables. It would be worthwhile to conduct an importance performance of UIS analysis.

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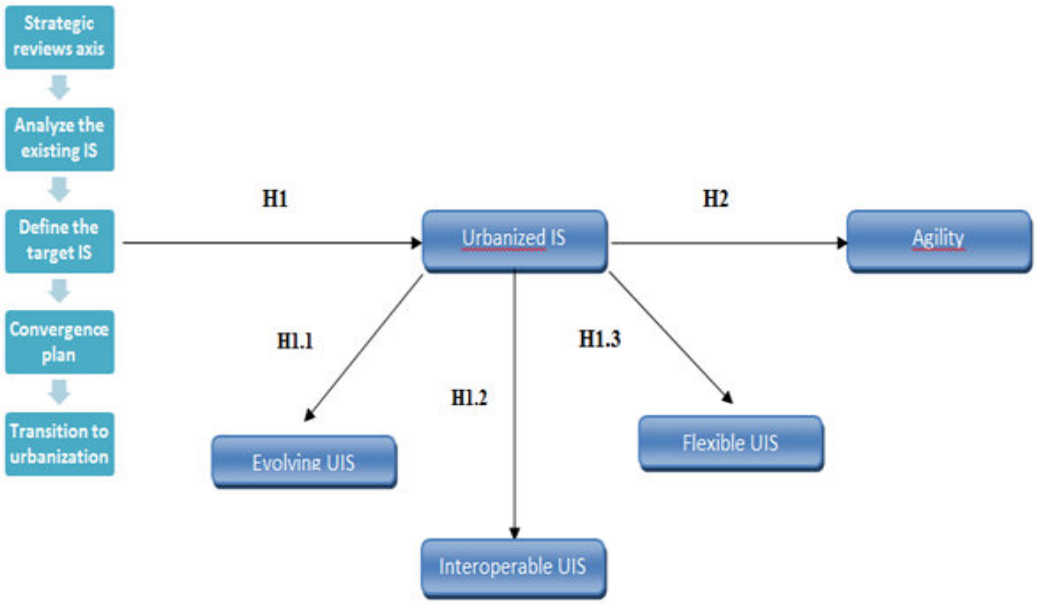

Table 4: The state of urbanization IS

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	20	10,2	66,7	66,7
	No	10	5,1	33,3	100,0
	Total	30	15,2	100,0	
Missing	System	167	84,8		
Total		197	100,0		

Table 5 : Obstacles of IS urbanization

		Frequency	Percent	Valid Pourcent	Cumulative Pourcer
	Technical Problems	2	1,0	6,7	6,7
	Financial difficulties	3	1,5	10,0	16,7
	Personnel availability	4	2,0	13,3	30,0
	Personnel qualification	1	,5	3,3	33,3
	Not concerned	20	10,2	66,7	100,0
	Total	30	15,2	100,0	
Missing	System	167	84,8		
Total		197	100		

Table 7: Chi square test of H1

	Value	df	Asymp. Sig (2-tailed)
Pearson Chi-Square	30,000[a]	4	,000
Likelihood Ration	38,191	4	,000
Linear by linear association	24,444	1	,000
N of valid cases	30		

Table 4: Chi Square test of H1.1

	Value	df	Asymp. Sig (2-tailed)
Pearson Chi-Square	22,500[a]	2	,000
Likelihood Ration	27,377	2	,000
Linear by linear Association	20,342	1	,000
N of valid cases	30		

Table 5: Chi Square test of H1.2

	Value	df	Asymp. Sig (2-tailed)
Pearson Khi-Square	26,154[a]	2	,000
Likelihood Ration	33,330	2	,000
linear par linear Association	20,696	1	,000
N of valid cases	30		

Table 6: Chi Square test of H1.3

	Value	df	Asymp. Sig (2-tailed)
Pearson Chi- Square	30,000[a]	1	,000
Likelihood Ration	40,381	1	,000
Linear by linear Association	29,000	1	,000
N of valid cases	30		

a. 1 cellules (25,0%) have expected count less than 5. The minimum expected count 4,80.

Table 7: chi square test of H4

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	22,500[a]	2	,000
Likelihood Ratio	27,377	2	,000
Linear-by-Linear Association	19,713	1	,000
N of Valid Cases	30		

3 cells (50,0%) have expected count less than 5. The minimum expected count is 1,00