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Enhancing Small and Medium Enterprises e-readiness for "Digital Tunisia": Investigation of status, barriers and support for e-business adoption

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***Abstract*— The present research is an assessment to identify the level of e-business adoption among the SMEs sector in Tunisia; besides providing valuable insights into the main barriers to the adoption and the usage of Information and Communication Technologies (ICTs) and e-business within those institutions. The research also aims to detect the available support by the government to promote the Small and Medium Enterprise SMEs e-readiness for the emerging digital economy in Tunisia. Two models were putted forward to serve as analytical tool in the data analysis; the usage of both models resulted in offering a holistic approach to e-transformation among the Tunisian firms. The micro analysis conducted in this research shows that the current level of e-business adoption is still considered limited in comparison with the offered advantages. According to the research findings among the important factors that affect further adoption of e-business by SMEs in Tunisia are: Business nature, the inability to perceive benefits, customers and suppliers' relinquishment and the resistance to change. These factors indicate an important degree of unawareness of the add-value of the e-transformation process to their businesses. Although that the adopted technology was not effectively being utilized by SMEs. A majority of surveyed SMEs have reported positive perceptions of their extent of usage and for the benefits obtained by utilizing ICT in their businesses.**

***Keywords* — SME, Tunisia, ICTs, e-business, adoption, usage, barriers, SCALE model, E-transition model.**

I. INTRODUCTION

The broad objective of this study is to unveil the readiness of the Tunisian economy to transfer into a digital economy by shedding the light on the e-readiness of SMEs for e-business transformation. It has been argued that investment in innovation is likely to spur development in a country by playing a supportive role or by acting as an endeavor to attract both foreign and local investment [1]. Under certain conditions, ICT and e-business adoption serve to improve the enterprises' development effort and their competitiveness. This study therefore arises out of the need to identify the level of e-business adoption of SMEs and to recognize the impediments predominant at various levels for different SMEs on the roadmap towards e-business adoption since needs and solutions will vary among firms depending on where they are standing.

***SCALE Model** [6]**:** Similar to other stages of growth models discussed in previous literature ([7]; [8]; [9]; [10]; [11]) **the** Scale model in this research assumes that in order to fully adopt e-business operations, organizations move through increasingly mature stages with respect to the way ICTs are

II. BACKGROUND OF ICT IN TUNISIA

A. Significance of ICT to the Tunisian Economy:

The ICTs have been since early 90's positioned at the heart of the country development and are considered an enabler for economic diversification and for the creation of new , value-added activities in all sectors[2]. Recognizing these opportunities, the Government of Tunisia have been placing an increasing emphasis on promoting the ICT sector ; Tunisia have been among the first African countries to implement an ICT- based national strategy. In 2009-2010, it was ranked the 1st in North Africa and 39th worldwide in the Networked Readiness Index (NRI) [2]. In the recently published World Economic Forum concerning the NRI, Tunisia was ranked 87 (out of148 countries) for the year 2014 and 81(out of 143 countries) in 2015 [3]. Today, in a globally integrated environment and recognizing the key role played by ICT in the economic and social development, Tunisia has consolidated the great importance it attaches to ICT by giving path to the new national strategy "Digital Tunisia 2018" intended to ensure the passage of e-transformation of Tunisia and to make it an international digital reference.

B. The Importance of Assessing the E-readiness:

Regarding the multiple level of ICT development today, to provide an exact definition of what constituted e-readiness; e-readiness can mean different things to different people, in different contexts, and different purposes [4]. Thus it is important to define e-readiness in the context of this paper. E-readiness of a SME is defined here as the ability of a SME to successfully adopt, smartly use and effectively benefit from information technologies (IT) [5]. In this research the Scale model will be applied as a micro assessment tool to identify the e-readiness of SMEs in Tunisia (not from a macro perspective at country level) allied with another model, the e-transition model, to identify the barriers of being "e-ready" in Tunisia.

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used in their daily processes, more specifically the internal and external processes.

***E-transition Recognition Model** [12]**.:** Most of the factors studied in the literature review merely represent the impediments in a single domain, which falls under post-recognition of the need for e-transition strategy, and have no hurdles been discussed prior to the identification of that need. Therefore, the factors that inhibit the e-transformation process in any organization are categorized into two key e-business recognition phases, which are pre-recognition phase and post-recognition phase. An e-transition recognition model is constructed through amalgamating the two recognition phases. It allows bringing all the hurdles into a big picture.

III. RESEARCH AND DESIGN METHOD

The research methodology used for this research was a multi-method strategy included quantitative and qualitative research approach. With the exploratory nature of the study, the collected data was initially analyzed using descriptive statistics then the findings were presented using graphs, table and text. The research data were collected from multiple sources: documentary evidence, survey and guided interviews.

Most of the researched data was collected by the questionnaires. They were distributed to a number of Tunisian SMEs. The choice of SMEs as a case to be studied was regarding the vital role they play in the Tunisian economy. These SMEs were from varied background since the sample was collected from different regions of Tunisia (Gabes, Sfax, and Tunis) and their business was varied (wholesale/retail, manufacturing, communication, agri-food, storage, construction and transport). For the interviews, they were conducted in a form of semi-structured interviews aimed at providing deeper insights into the underlying issues observed in the research. Descriptive analysis was used to evaluate the obtained data from the interviews concerning the current level of ICTs adoption among SMEs in Tunisia and the support provided by the Tunisian government intended to promote the current level of e-business adoption and usage.

Two important parts of the analysis process was based around two conceptual frameworks: 1) SCALE model and 2) e-transition recognition model. The existing two models served as analytical tool in data analysis; the first conceptual model was applied to measure e-business deployment with internal and external business processes of SMEs and the second was putted forward to identify barriers predominant at various levels on the roadmap towards fully adopting e-business operations. The frequency distributions were used to evaluate each stage of both models. The frequency distributions were also used to describe the level as well the types of e-business solutions being implemented and the perceived benefits from e-business solutions adoption and usage.

It should be noticed that the terminologies “e-transformation”, “e-transition” and “e-business operations” are used in this study interchangeably.

IV. RESEARCH FINDINGS

The research provides an insight into the levels of adoption and penetration of ICTs and e-business solutions in SMEs in Tunisia by investigating ICT infrastructure (Figure1) such as Enterprise Software usage (Figure2), e-commerce applications (Figure 2), types of websites used and types of social commerce profiles adopted. [13] [14].

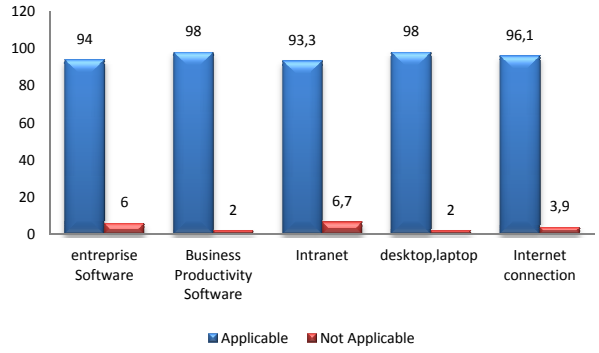

Fig 1 ICT Infrastructure

It was observed that the majority of the surveyed SMEs are having an interesting **level of adoption** of the basic **ICT infrastructure** such as computers, intranet, Internet access, BPS and some ES (such as Accounting packages, HRM, etc); while a lesser rate of the sample is adopting more complex processing software (such as CRM, SCM, etc).

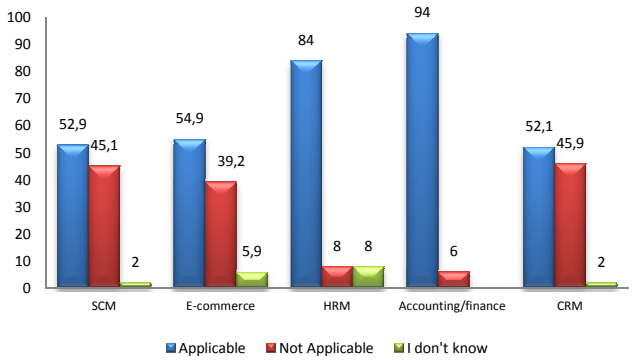

Fig 2 Enterprise Software usage

The results of the collected data indicated that the general level of e-commerce usage among the SMEs in Tunisia is at a fairly high state [13]. Most of users confirmed their usage of an important number of these applications while conducting their daily business operations like online advertising, online customer support services, e- financing / e-banking (such as bill payment, tax payment), etc. However, most of the implemented applications among the Tunisian SMEs are basic ones such as email and simple online presence appeared in websites possession and / or social media profiles possession (informative). But, the level of online commercial diffusion is

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still relatively low; According to the findings the majority of the online enterprises are there for advertising followed by customer support service and e-financing and e-banking services as reasons (figure 3), then for marketing purposes. These findings reflect the growing interest of the Tunisian enterprises towards e-banking and e-finance services and towards online customer related services in general. Yet, almost half of the studied businesses do not practice any online order processing or order tracking and only the third of these firms possess a payments system.

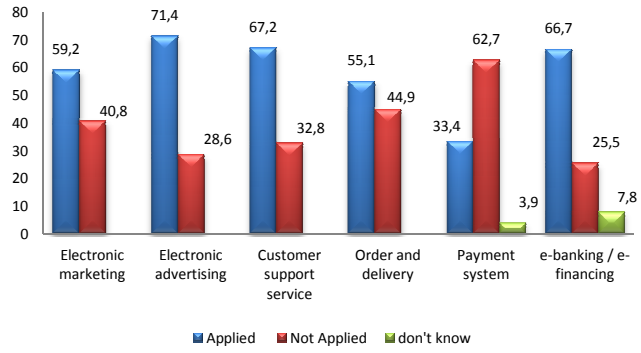

Fig 3 Usage of e-commerce applications by SMEs

This might be justified by a lack of internal capabilities as long as a more advanced information systems are involved and a kind of reluctance to change in the existing business process and to introduce new processes. However, having more than a half of the respondents ticking almost all the suggested applications indicates an interesting development in e-commerce adoption in Tunisia; yet, the study of the extent of its usage, proved to have little intensity for the advanced applications. Accordingly, the adoption of e-commerce applications is still considered moderate among the SMEs in Tunisia and its development is still of a slow pace.

The gathered data was analyzed to recognize level of ICT sophistication by determining the positions of the studied SMEs on the SCALE model (Figure 4); the model suggests that firms need to go through sequential stages where the activities are cumulative [15]; the focus was on the internal and external business processes each individually; the firms were classified in each stage as long as they have adopted one of the applications in that stage. The application of the SCALE model proved small discrepancies of level of the adopted stage for each process of the same enterprise (Table1). According to the SCALE model, the majority of the Tunisian enterprises are at Access stage of the model for the internal process while slightly advanced up the model to the Leverage stage as long as the external systems are concerned. Applying this model to Tunisian SMEs confirms that the two processes discussed above are not always moving up in parallel among the same enterprise.

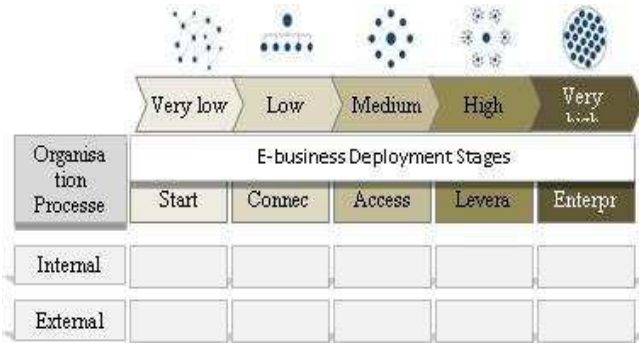

Fig 4 The modified SCALE model for Tunisian SMEs [15]

According to the analysis, an enterprise can be at two different stages on the SCALE model for each process. For example, it is possible for a firm to be in an advanced stage on the external process overall but at a lower stage of the model on the internal process overall as well. However based on the feedback from the questionnaires, the e-business transformation process in the Tunisian SMEs seems to be more significant for the external process than for the internal process; this reflects an increasing interest of firms today towards the "click and brick" model. Yet the discrepancies between the two processes are not so high. This sounds upright for the e-transformation operation since only when the internal information systems are fully converged with the external/online information systems the e-transformation is achieved [16].

TABLE 1
E-business deployment assessment in the Tunisian SMEs using SCALE model [7] [6] [16]

	Start	**Connect**	**Access**	**Leverage**	**Entreprise**
Internal Process	2%	16%	36%	20%	26%
External Process	2%	18%	24%	34%	22%€

The problems and issues inherent to each stage need to be resolved before the organization successfully advances to a more mature stage [17] Therefore, an initial research of the reasons surrounding the modest adoption and usage rate of e-business operations by the SMEs in Tunisia was conducted and analyzed using e-transition recognition model (Figure 5). The findings indicated that the inhibitors factors were related to the two phases of the model (pre-recognition and post-recognition phase); the suggested barriers by the model to be studied were of environmental, governmental, financial, organizational, technical and behavioral nature. However, further analysis showed that the factors related to pre-recognition phase have a more significant negative influence on the adoption of ICTs and e-business solutions; the factors of behavioral and environmental nature, such as resistance to change, business nature, the inability to perceive benefits (ROI) and customers and suppliers relinquishment to use these technologies, were highlighted as main factors. Yet, further

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analysis pointed out that the lack of internal expertise (Lack of resources) has seriously hindered ICTs sophistication and evolution within most of the firms though it was not disclosed by the respondents as a main barrier.

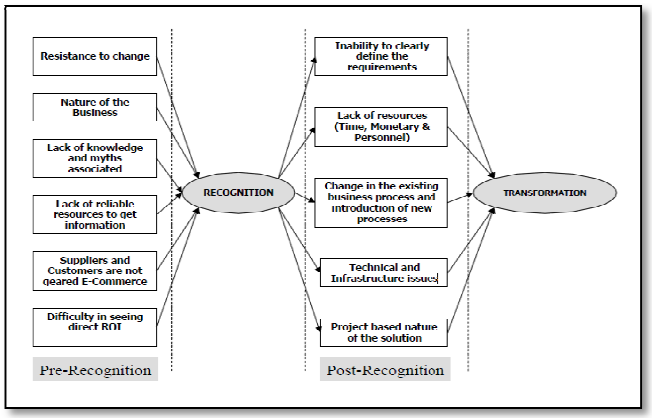

Fig 5 E-transition Recognition Model [18]

However, this is not surprising because SMEs always lack skills amongst workforce to use ICT [19]. This lack in ICTs skills might be justified with the lack of commitment of the decision makers to train staff and fully exploit ICT gadgets.Therefore, they must overcome this problem through either seeking help from external sources or developing their own internal end-users' computing skills [20] In addition, the lack of reliable resources to get the correct information about e-transformation and the lack of knowledge and myths associated with e-commerce and Internet usage (such as the security concerns in terms of financial transactions and complicated and unclear laws and regulations) affected lesser the e-business adoption process as barriers. The findings seemed to presuppose that most SMEs have overcome the other barriers particularly those that are informational, infrastructural and financial in nature such as the inability to define the requirements or technical and/or infrastructure problems and lack of monetary resources.

The analysis of the collected data showed that the majority of respondents to the survey proved to have positive perceptions and attitudes towards the use of ICTs in their workplaces [21]; the majority consider them as working tools which leverage the performance of ICTs in achieving positive organisation outcomes. Only a minority are not viewing them as crucial tools for their business operations.

The research analysis indicated the unawareness of an important proportion of the surveyed SMEs of the value of the used technologies; they have been found to be doing business electronically either consciously or unconsciously. The unaware respondents believed that their online presence was there for advertising and liaise and collaborate with their suppliers and customers [22] [23] (Such as order enquiry and online exchange of documents) and not for e-commerce or e-business operations; which would explain the negative responses to the questions related to their usage. Yet, providing better customer services, maintaining the business and improving quality standards were considered the most perceived benefits (Figure 6) by the conscious users of e-business operations[24].

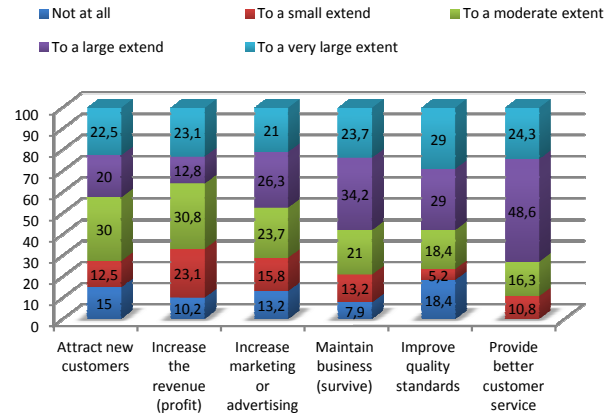

Fig 6 The frequency distribution for rating the perceived benefits of e-business adoption and use.

The research findings tried to detect the available support addressed to SMEs in the ICT sector. By shedding the light on the current and the planned governmental support; from the data collected of the conducted interviews, it was clear from the prepared plan, which were inclusive (incentive, regulatory and awareness-raising oriented), the great interest about the enterprises sector in the innovation framework. Important projects were already approved in the framework of "Digital Tunisia 2018" strategy. These were clear evidences that the government is trying to do enough efforts to help the e-transformation of SMEs. Nonetheless, the efforts dedicated to SMEs still need to be emphasized by accelerating the approved projects and more importantly by making additional efforts to raise the awareness level to the importance of the e-transition process.

V. CONCLUSIONS

As presented in the first part, the main objective of this research is to gauge the level of e-business adoption among SMEs in Tunisia through using an e-adoption model. The SCALE model was introduced as the conceptual framework for assessment. The model succeeded to fulfill the needed answer by focusing on the assessment of three important elements for the e-transformation operation: people, process and technology; It revealed that the majority of the firms are generally matured in their deployment of the basic ICT technologies. While only a humble proportion of the Tunisian enterprises were matured, to a certain extent, in the adoption of the basic functionalities of e-business which allow them to conduct the primary activities of their businesses (create/advert/ market/ deliver/etc of product or service) and other support activities (procurement/ HRM/ Accounting/…). This research also intended to identify the barriers to the growth of e-business among SMEs in Tunisia. Therefore, the e-transition model was applied to allow a further focused on

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the challenges faced by SMEs in Tunisia at different levels of ICT sophistication in the adoption process. The model was applied at different levels of the ICT technologies adoption which allowed finding out what are the barriers that holding them back from moving to the next desired stage on the SCALE model and the e-transformation process.

The usage of both models resulted in offering a holistic approach to e-transformation among the Tunisian firms. According to this research, the general level of adoption and utilization of ICTs among most of the firms remains modest and uncoordinated; the ICT awareness is patchy among these organizations and a clear lack of any overarching strategy for e-business adoption. Hence, the full integration of these technologies among the Tunisian SMEs remains a key issue; they still have many advantages yet to be derived from embracing e-business operations in both their internal and external processes, they are making progress at a slow pace due to, not solely, to the various environmental barriers they are facing but more importantly due to their reluctance in making change in their businesses operations or by only conducting small steps to change and not incorporating all the features of the adopted level.

Like other empirical studies, this study is not without its limitations. First of all, the refusal of some SMEs' owners / managers to participate in the survey because of their the preoccupations, the incompletion of some important parts of questionnaires, the time limit, and not having a very low response rate on the online survey are the main reasons that limited the sample size; the final sample obtained is considered relatively small, it consisted of 51 SMEs from 3 different regions of Tunisia. Therefore, the generalization of the results of this study should be done with care. Second, the measure of each enterprise level of adoption and the extent of usage of the available ICTs was based on the self-reporting of respondents. Additionally, we interviewed only one informant per SME which did not most of the time knew all the answers which made the "don't know" responses unavoidable. Thus, the reliability, validity and accuracy of the provided answers could be more assured by adding more respondents per firm. Finally, as the study was carried out in a developing country, Tunisia, and the introduced model for the level assessment of ICT adoption was the SCALE model, which is mainly developed to suit the developing world business environment, hence the generalisability of the study findings to developed countries may be limited. However, the same findings probably can be generalized to other developing countries.

As for future studies, with an increase in the sample size, potential correlations may be examined between the independents variables (such as Gender, Age, Educational level and Number of years in business) and the level of e-business adoption. Also, the efficiency of the ICTs usage and their effects on the productivity of the SMEs would be a complimentary step to the findings of this research. Other research consideration would be a comparative study of the level of e-business adoption by SMEs among the different sectors.

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