

A Qualitative Study on e-Business Adoption by Maltese Family Owned Manufacturing SMEs.

Key Words: e-business adoption, DOI and TOE, owner/managers, family owned manufacturing SMEs.

Abstract : The purpose of this qualitative study is to explore the readiness and likely level of e-business adoption by family owned SMEs in Malta. Small and Medium Enterprises (SMEs) with limited finances and human resources were studied to explore the readiness that motivated or inhibited their readiness to invest in this technology. A multitude of factors may influence the adoption of e-business. These decisive factors must be systematically evaluated and categorised to explore the reasons why some SMEs are ready to gear up for this investment or not. The purpose of this study is to identify the likely levels that the SMEs under lens expressed by exposing their procrastination or final decisions to adopt or not e-business as part of their modus operandi. Therefore, this study describes a research model that is based on the diffusion of innovation (DOI) theory and the technology, organization and environment (TOE) framework individually and in combination. Data was collected first by a pilot study of two SMEs, to test the instrument with a face to face interview of the owner/manager of the firm that represented the firm in its entirety on all operational and administrative decisions. For the pilot study one small and one large SME were selected, and for the main study participants of 20 SMEs, 10 small and 10 medium SMEs were selected. In summary, the results of this research have shown serious inhibiting concerns on, security, costs, technology readiness, data protection, competitive pressure, supplier/customer pressures, private banks and the Maltese government and E.U regulatory support, were found to have significant influence on e-business adoption for SMEs.

Introduction : In the early 1990s, e-business (electronic business) was already introducing a new way of doing business, the reliance during the information age was already a vital part of peoples' lives (Kalakota and Whinston 1996; Zwass 1996; Lee et al. 2009). Nowadays, the 1990's are a distant past, and we are well underway in the new millennia in a completely different era from the information age, the cyber age. The cyber era entered in the new millennia by transforming how we not only use I.T as a status symbol or for information purposes only, but has become a prosthetic necessity. Modern consumers, practitioners and governments are paying increasing attention to e-business because of its potential as a strategic tool. According to data from the Organization for Economic Cooperation and Development (OECD), on average, 96% of its sample firms spread in every continent used the Internet on a daily basis and 69% of SMEs had their own websites in 2018 (OECD 2018a). Additionally, an increasingly high percentage of individuals are using the Internet not only for information and communicating with others only, but shop online, learn academically, social networking, banking access, pay bills and many other functions (OECD 2018b). Witnessing the strong growth of e-business, academics have directed increasing attention to e-business research, with various studies observing a surge on e-business studies (Lee et al. 2007).

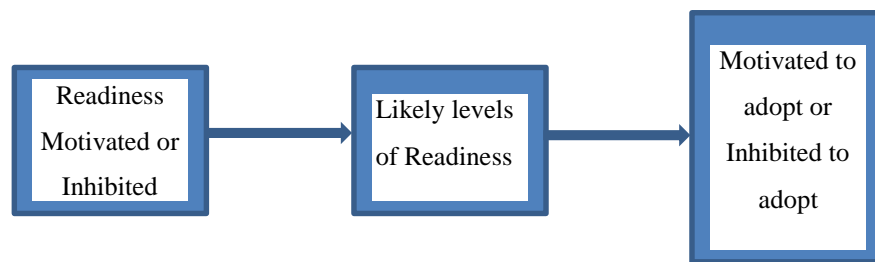
Chen and Holsapple (2012) asserted that e-business adoption is a critical and growing topic called e-business phenomena that raised different topics in terms of theories, research methods, and contributions. At the same time, e-business adoption is an instance of IT acceptance and use because it involves a setting that combines the type of readiness to adopt new marketing elements and the likely levels to go 'for it'. Moreover, under the umbrella of e-business adoption, many research questions can be raised and investigated by different methodologies, such as adoption factors, adoption barriers, adoption theories, and adoption differences across continents, nations, regions, and cultures.

e-business Adoption: The definition of e-business can be interpreted in different ways. Holsapple and Singh (2000) collected diverse information printed/electronic, academic/practitioner sources, including seminal and contemporary publications. From this collection, a definitional taxonomy was derived that yielded five views of e-business i.e. retailing and trading, information and cyber exchange, on line activity, on line effects, and value-chain views. These five views formulated an analysis and integrated a definition of e-business by synthesising the group.

“E-business is an approach to achieving business goals in which (networked, computer-based) technology for information exchange enables or facilitates execution of activities in and across value chains as well as supporting decision making that underlies those activities. Henceforth, this is what we mean by the term, and our investigation of e-business adoption occurs within this broader context” (p161).

During the evolution shift from the information age to the present cyber age, new terms to e-business were included such as innovation, technology, application, service, and business models. E-business can be a tailor made software or a high intensive network that must be adopted before the benefits can be realised (Zhu et al. 2006). As such, technology adoption theories and technology diffusion theories have been applied in the context of e-business. Summarizing some literature on technology adoption, Hong and Zhu (2006) and Cao and Mokhtarian (2005) discovered over 10 theories that have been employed on technology investments. Modern e-business terms associated with e-business such as assimilation, readiness, diffusion, acceptance, implementation, intention to use, and actual usage appear in connection with e-business adoption. It has been observed that researchers differ on how these relate to adoption such as Urbaczewski et al. (2002), Hernandez et al (2009) Chen and Holsapple (2012). In his studies Hernandez et al. (2009) argued that adoption and acceptance are two different decisions that an SME can face, still many researchers usually associate the two terms without any distinction between adoption and acceptance. This is evident in two theories with the term “acceptance,” TAM (Technology Acceptance Model) and UTAUT (Unified Theory of Acceptance and Use of Technology) being used for investigating technology adoption. As an example on innovation diffusion, the owner/managers readiness were studied in three stages shown in Figure 1: the type of readiness, the likely levels of readiness, and motivated to adopt or inhibited to adopt, were terms focused on evaluating the likely levels in adopting e-business and whether the 20 owner/managers were prepared or not to adopt e-business, as e-business acceptance and adoption were focused on making decisions to use e-business.

Figure 1: The three stages of e-business adoption



This study does not distinguish between the terms of acceptance from adoption of e-business, as both are absorbed in the quest to explore the SMEs in this study on how ready they are and what is shackling them from investing in this technology.

Adoption Models : For the past three decades, academics have tried to determine the factors that influenced the diffusion process of different technologies by developing new theories that addressed every angular aspect on I.T adoption. The most prominent are nine major theories in this field of study, they are theory of reasoned action (TRA), the technology acceptance model (TAM), the motivation model (MM), the theory of planned behaviour (TPB), the combined TAM and TPB, the model of PC utilization (MPCU), diffusion of innovations (DOI), technology environment organization framework (TOE) and social cognitive theory (SCT). Among these theories, DOI is one of the most commonly used theories that try to explain and predict the adoption of innovations. DOI is a theory developed by Rogers (1995), which has originated from sociology studies. In their majority, these theories explained and tried to predict the adoption decisions of firms, based on factors that are related to the technology itself (such the characteristics of the technology, or users' perception about the technology). Importantly, technology-related constructs are not the only factors that influenced the adoption of technologies. There are other factors (such as environmental and organizational factors) that influenced the decision to adopt an innovation. These factors, specifically environmental factors, are not taken into account in DOI dimensions. The TOE is a theoretical framework that overcomes this drawback. This framework does not only address the technological aspects of the diffusion process, but also non-technological aspects such as environmental and organizational elements. According to Hsu et al (2006), the TOE strengthens on the DOI's ability to explain the intra-firm innovation diffusion.

Rogers (1995) Diffusion of Innovations (DOI) : The DOI is principally based on the organic characteristics of the technology and the individuals perceptions of the innovation. When it comes to the organisation of a firm, on the other hand, it is more complex than individuals are. Rogers (1995) DOI, suggested that innovation is a flow of communication processes using different channels within a social system. The DOI for this study was based on three elements that influences the adoption of innovation in organisations. They are individual characteristics, owner/managers' influential powers towards change, previous experience, age, qualifications, internal characteristics of the organisational hierarchal structures, organisational culture and change, and financial slack, and external characteristics, system openness, competitive pressures and external support of the organisation. There are various definitions for innovations.

Most commonly, innovation is considered as any new creative idea, a process, a new product, introduction of new technology, that is accepted as compatible with the norms and values of the individuals perceptions and norms of a social system. The individual will accept and seek at a faster rate this innovation than any other imposed or coerced innovation, which could not be compatible with the individuals perceptions and norms.

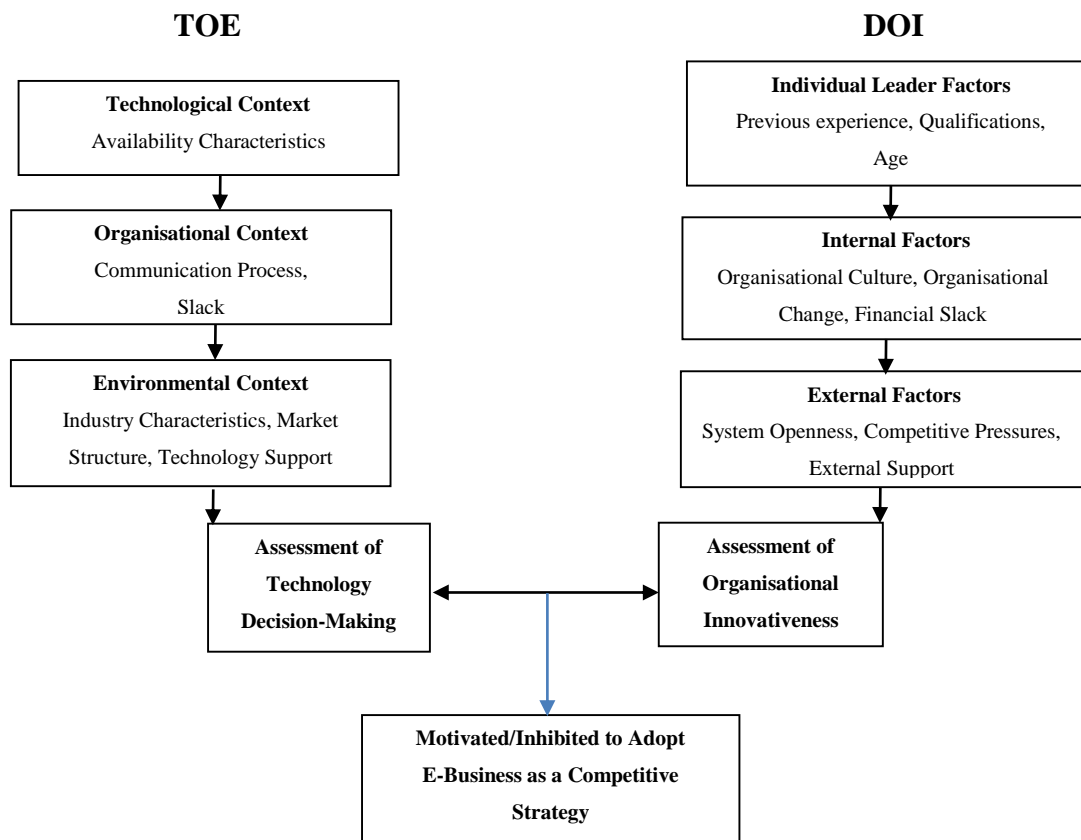
Tornatzky and Fleischer (1990) Technology-Organization-Environment (TOE) :

Tornatzky and Fleischer (1990) proposed the TOE framework that defined innovation from a firms point of view. It is made up of three dimensions that a firm can be influenced by adopting an innovation i.e. technology, organisation and environment dimensions. The technology dimension refers to the internal and external technology that the firm possess and what can be relevant to the organisation including what the relevant available technologies that are available are able to inspire adoption. In this study the organization dimension referred to the descriptive characteristics of the firm, slack, size, communication process. The slack of the firm refers to the human resources and slack resources, the size if small or medium category as per E.U (2003) standards. The communication process refers to as the formal and informal flow of communicating inside the firm. The environment dimension comprises the Industry Characteristics, Market Structure, Technology Support Structure and Government Regulations, that comprises the type of market the firms operate in and the industry characteristics that firms form part of. Government regulations that influenced the perceptions and norms of the owner/managers way of accepting the authorities and the way financial and regulations are presented to them. Technological aspect of the TOE framework refers to both availability and characteristics of the technologies. Any internal and external technology that is relevant to the firm is part of the technological aspect. According to the TOE, technologies possessed by the firm and in use, and technologies available in the market that are new and more intensive can influence the readiness to adopt e-business. Technologies that are currently possessed by the firm influenced the way an SME firm is motivated or inhibited to adopt e-business, because the owner/managers had the vested powers with total control on any investments that concerns their firm. The power possessed by their family status in industry can define the scope and financial limits that the technological change will bring to their firm, only acceptable to the owner/manager. On the other hand, the technologies that are available in the market but not in use by the SMEs of this study impose a heavy influence on their adoption decision, because modern technologies 'impose' on how firms can or when they evolve by the adoption of new technologies. According to Tornatzky and Fleischer (1991), technologies that are outside the SMEs scope and boundaries are creating additional and most often synthetically outsider interference. The organizational dimension of the TOE describes the communication process and slack in general. The SMEs in this exploratory study registered a limited communication not only between shop floor skills, but also with senior management. The communication between shop floor can be described as non existent, whilst very limited communication and acceptance of senior management views were considered by the owner/managers. . Researchers like (Jorge 2020, Abor and Quartey 2010, Pitchayadol 2018), believed that decentralised organisations are best suited for innovation stage; while centralised organizations are best suited for implementation stage of innovation process. Communication process within the organisations of this study is another organisational dimension that influences the adoption process.

Top management involvement can be a beneficial influential factor, which can motivate more and inhibit less the adoption of e-business. There are different opinions about the role of slack resources in the organizations. The organisational slack of the participant SMEs does not necessarily support e-business adoption. The role of slack inside organisations in relation to I.T. investments is yet to be understood more as there are no defined relationship between SME slack and adoption rates. The environmental dimension aspect of this framework refers to industry characteristics, market structure, technology support structure, and government regulations. In the current and rapidly growing industries, technologies are becoming more of a necessity rather than a commodity in modern internal and external market mechanisms. In this study what was a common phenomena among those least likely to adopt e-business is that they all have stated on the future need for them to adopt and that technology was a refinement on their operations drastically to the better. So, the industry characteristics of this SME sector and the technology support structure is there for them to grab apart from their concerns when it comes to government and EU regulations and financial aid by private bankers. Government regulations were of a great concern that had an impact on the participants of this study as government regulation and support was a clear influence on their readiness that motivated or inhibited e-business adoption.

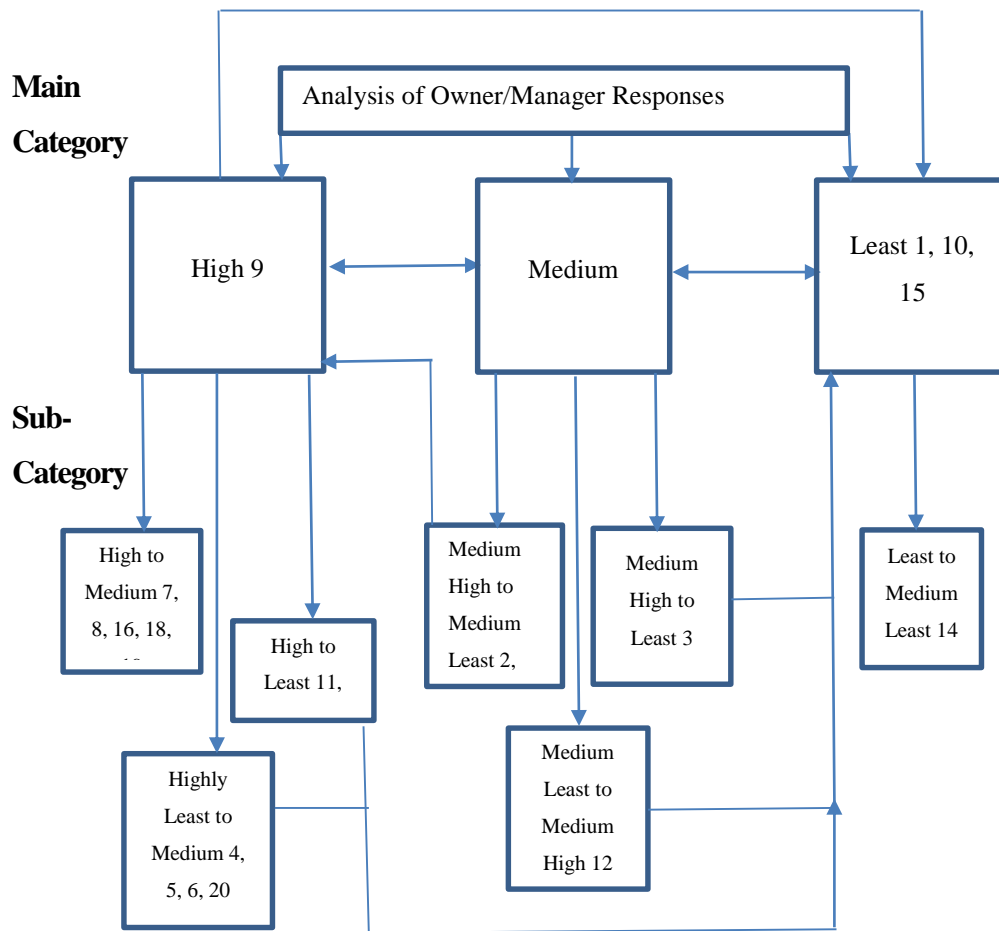
Combining the DOI and the TOE : There have been various numbers of literature in the past exploring the use of innovative technologies that combine the DOI framework with the TOE theory to strengthen their studies on both the organic diffusion and the organisational perspective at the same time (Hsu et al 2006). This combination will allow a better focus on the impacts of both the internal and external factors of innovation technology adoption and diffusion (Zhu et al., 2006a; Tornatzky and Fleischer, 1990). As reported by Piaralal et al. (2015), innovation diffusion theory combined with TOE framework provides a useful theoretical framework for SME logistics to adopt e-business technology and explore what motivates or inhibits the owner/manager to invest in this technology by the overall consideration of internal and external factors. Wang et al (2010) combined the important factors of both theories to explore the key factors influencing the adoption of Radio Frequency Identification (RFID) in the manufacturing sector. Ramdani Kawalek and Lorenzo (2009) combined the TOE framework and diffusion of innovation theory to explore the factors of adoption of firms in general. In addition, Alshamaila et al (2013) combined both theories to identify the influencing factors in the adopting of the cloud computing by SMEs. Oliveira et al (2014) also explored the key factors of cloud computing adoption in service and manufacturing industry by combining the DOI and TOE. As Thong (1999) suggested that due to the rapid evolutionary changes from the information age to cyber technology and its characteristic, whether a single theoretical model can be applied to all the subjects is still arguable. Oliveira and Martins (2011) also indicated that it would be important to combine more than one theoretical model in future studies in order to strengthen and tightening similar studies with better understanding of the adoption of complicated innovation technologies. Hence, this study integrates the DOI theory with the TOE framework and proposed an integrated research model (see Figure 2) next page.

Figure 2: The Proposed Combined TOE & DOI Research Model to Study E-Business Adoption by Family-Owned SMEs in Malta. Developed from Tornatzsky & Fleischer (1990) and Rogers (1995).



In Figure 2.0 the combination of the DOI and the TOE had the individual ability of assessing the technology decision making of the TOE, and the assessment of organisational innovativeness of the DOI. These two theories were able to assess the owner/managers' readiness and what motivated or inhibited the adoption on e-business as a competitive strategy. The assessment was split in three main categories, the highly likely, the medium likely and least likely, according to the min/maj motivators and min/maj inhibitors. A face to face interview strategy was adopted and the sample, purposefully selected 20 family owned manufacturing SMEs owner/managers, 10 small and 10 medium sized. The main participant to be interviewed was the owner/manager of the firm. The reason for this type of selection of participant was that the owner/manager had full control on the operations and management of the firm. The thematic analysis of the findings by the combined assessment of the DOI and TOE, were categorised in highly likely and least likely levels to adopt e-business and none of the SMEs qualified as fully fledged in the medium likely main category to adopt e-business (see Figure 3). Many SMEs did not qualify in most of the main categories, so a sub category had to sub categorise those SMEs that were flowing in and out with multiple minor inhibitors and few major motivators to adopt e-business.

Figure 3: Main Categories and Sub-Categories of Likely Levels of SMEs



The main and sub-categories shift interchangeably between themselves i.e. the high and the medium categories and sub-categories, whilst the least category and sub-category shifts only towards the medium category and sub-category only.

Conclusions and Limitations: This study revealed the current family owned manufacturing SMEs landscape of e-business adoption research in Maltese context. Overall, e-business adoption is a growing topic, both across years (longitudinally) and compared with other topics (horizontally). Although the distribution of publication outlets varies across years similar studies keep growing, either in the frequency or percentage. In this field of research, studies are still limited as with multiple search keywords in the title, theories, data collection procedures, and data analysis techniques and methodologies. The large majority of studies remain on multiple regions and nations with larger economic strengths that cover various continents and market mechanisms compared with the Maltese micro-economy. Among them, European, American and Asian regions that have widespread and advanced economies, even in the mediterranean basin, but e-business adoption research for the small countries with microeconomies similar to Malta appears to be start growing. Quantitative methodologies still remain as the dominant research method, especially for investigating e-business adoption by SMEs.

E-business on SMEs requires the examination of themes, however, adoption by business organisations are still predominantly popular by three commonly studied themes on online banking, online shopping, and online education. During the 5 year window of this research, some research themes such as social network and supply chain management have grown rapidly, whilst internet access and website development have dropped drastically. Compared to extant review studies, this study focused on e-business adoption by owner/managers of family owned manufacturing SMEs. The research themes were linked with the DOI and TOE that provided this study practical implications for e-business adoption researchers. The study findings explored the characteristics of the state-of-the-art e-business technology adoption investment as a platform for seeing future research needs, a fresher positioning of future investigations, and an increase in support by the identification of relevant literature. Armed with a better understanding of e-business-adoption research, along multiple elements and dimensions described in this study, both practitioners and researchers can benefit.

This study like any other studies has some limitations, although it was the authors endeavour to minimise bias by using various approaches. First, in order to search a comprehensive list of relevant articles, it was slightly more difficult to relate search keywords, not eliminating the possibility that some articles were missed that were strongly related to e-business adoption, even though these terms do not appear in their titles. Second, when using the sample articles to characterise the research landscape, all articles were equally treated, regardless of their publication outlet, quality, and impact. Although such an approach is commonly used in review studies, some articles may have had more impact than others that were in hand. One question is whether and how we should give more weight to the successors or senior management of the firms. This study is based on a sample of e-business adoption publications which focused specifically on the owner/managers participation in the main study. Coding bias is practically unavoidable and is very difficult to avoid in a study of this type. However, bias was extremely monitored to lower the risks as much as possible by examining and testing consistency and truth value of every journal, article and publication. The elements and dimensions used in this study were sufficient to describe the research landscape of the Maltese family businesses. However, this study focused on the pre-adoption of e-business investments with elements and dimensions that may have ignored the post adoption and the competitive strategies gained including the financial and human resources management to accelerate more the motivational factors to adopt e-business.

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