A Review on Business Intelligence for Small and Midsize Businesses (SMBS)

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Abstract Every single organization is confronted with an enormous number of obstacles, but this is especially true for small and medium-sized organizations who are seeking to grow with traditional technologies. Therefore, in order for organizations to be successful in overcoming the challenges, they need to implement business intelligence by utilizing the management of information technology systems. This study proposes a conceptual framework that identifies the potential factors that influence the adoption of business intelligence systems in the context of the small and medium-sized company (SME) sector in Libya. The SME sector is a sector that is comprised of small and medium-sized businesses. Two key concepts that served as the basis for this research effort were the technology acceptance model (TAM) and the unified theory of adopting and using technology (UTAUT). Both of these models were developed by the National Institute of Technology (NIST). This research suggested a conceptual framework that would incorporate a number of different aspects, such as the management of change, the sharing of knowledge, the quality of information, the management of business intelligence projects, the perceived usefulness of a business intelligence system (BIS), and the perceived simplicity of adopting a BIS. The findings of earlier research that explored this kind of influence are consistent with this proposal, which is in accordance with those findings. This study did not take into account the impact that environmental factors have on the adoption of a business intelligence system (BIS). This is because individual small and medium-sized businesses (SMBs) have their own distinct features in terms of the sector or industry type in which they operate.

Keywords small and medium-sized organizations, business intelligence systems, technology acceptance model (TAM)

Introduction

Information systems, often known as ISs, are an extremely important component of the modern economy in every region of the world. They enable businesses and organizations to carry out a wide range of operations, both complex and simple, at a rapid pace [1,2]. Therefore, over the course of time and across the globe, information systems and information technologies have been continuously undergoing development, which has resulted in a significant influence on the manner in which information is handled in the present day. The dissemination of information around the globe not only assists in the accomplishment of an organization's goals, but it also enables the company to enhance the organization's decision-making process in a manner that is both productive and competitive [3]. Let's say we use the corporations that have expanded their operations around the globe as an example [4]. Taking this into consideration, it is possible to draw the conclusion that the success of their expansion is mostly attributable to the effective management of their technology resources, which leads to a prompt response or sound decision-making in the face of a variety of challenges that may arise. As a result of their emergence in the corporate sector, they are able to achieve client satisfaction in an efficient and effective manner [5].

Data management tools are getting increasingly difficult to use and are becoming obsolete [6]. Nowadays, almost every company records some kind of action and then creates, stores, and edits massive amounts of data

about it. The term "business intelligence," initially used in 1989 by Howard Dresner of the Gartner Group, was used to the technologies that emerged in the 1980s in response to this demand. These systems provided decision-making support solutions. The goal of this term is to lay the groundwork for a collection of technologies that can retrieve corporate data from different management systems and process it in a way that any user or person can use to gain the intellectual knowledge they need to implement the proposed tasks and achieve the business goals.
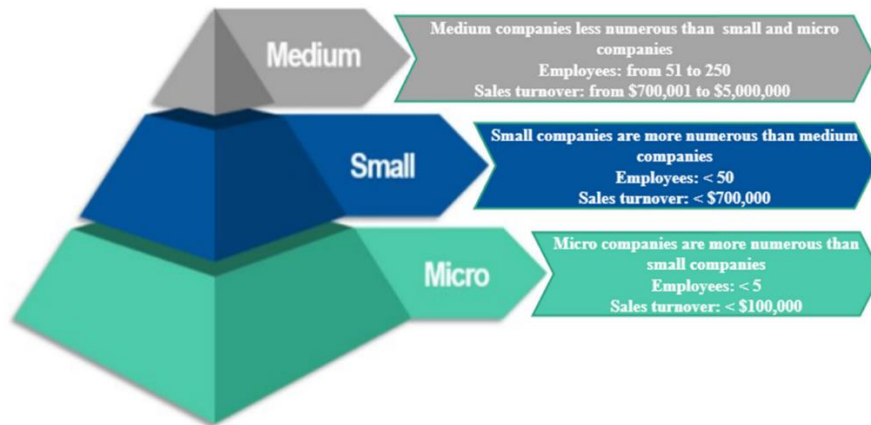

Figure 1: Libya's SME categorization system

Alternatively, it is referred to as the "business intelligence model," a methodical strategy for creating business intelligence. The model's many levels reflect the various types and treatments of data. There are three main parts to this system, and they are the balanced scorecard, the management scorecard, and the operational scorecard. Methods and operations, leadership, and planning are the triad that constitute this framework. The major goal is to equip businesses with the information they need to make decisions that will sustainably benefit them and help them become more competitive over time. The term "business intelligence" (BI) was initially popularized by Howard Dresner, a consultant for Gartner. Dresner used it to describe a set of concepts and practices that improve decision-making by leveraging factual knowledge about what has happened [8].

Business intelligence is defined as "an interactive process to explore and analyze structured information about an area (normally stored in a Data Warehouse), with the goal of discovering trends or patterns, from which to derive ideas and draw conclusions" [9]. This description comes from Gartner, which is a provider of business intelligence services.

However, due to the fact that they are large companies, they also face challenges in this regard. Among these difficulties is the fact that there aren't enough resources to help businesses make better decisions in the face of massive amounts of data. A further drawback of big businesses is their increased response capacity, especially when compared to multinational corporations. Being major corporations, they are confronted with these difficulties. In Libya, a small and medium-sized enterprise (SME) is defined as a business with less than fifty employees and less than seven hundred thousand dollars in revenue [10]. The fact that SMEs can't respond to changes in the international market is another obstacle they face. For that reason, the focus of this study is on SMEs, or small and medium-sized enterprises.

Literature Review

The major goal of developing the TAM was to examine the impact of extrinsic factors on internal variables such as belief, attitude, and intention. Its principal motivation for creation was this. Based on this approach, the perceived usefulness and ease of use of the system were the two most essential factors explaining its adoption.

Both of these elements contribute to the consumers' opinion of the information technology system being negatively impacted. In addition to these two primary variables, it is believed that a variety of external circumstances will have a substantial impact on the degree to which users embrace the system in the TAM. Due to the fact that the initial research on the TAM was utilized for the purpose of designing information systems for businesses and applying them to professional users and Because folks do not have the same level of expertise as experts when it comes to their usage of technology, the TAMs that were utilized in the initial years ought to be modified so that they are more appealing to the end user. Humanitarian and social factors should be incorporated into the model through the addition of new variables [11]. This is because of the rationale for the recommendation.

Using a combination of social influence and environmental elements, as well as the ideas of performance and effort expectation, the UTAUT is able to maintain the theoretical foundations of the TAM [12]. Additionally, he

stated that other factors that play a significant role as direct predictors of user approval include social influence, enabling conditions, performance expectations, and effort expectations. The UTAUT provides a more comprehensive definition than the TAM, and its acceptance rate in the intention to use is 70%. In particular, there are four distinct structures that influence the user's adoption and utilization of IT that make up the UTAUT model. The intention to use has three direct components: expectations of performance, expectations of the amount of work necessary, and expectations of the social impact. It has been demonstrated that the intent and the environment that facilitate the behavior of the user are direct factors. A person's self-efficacy, anxiety, and attitude toward the use of technology are not direct indicators of their intention, according to the model.

A.   Data Science Tools for Small Businesses

A major contender for the most impactful technology of the 21st century is the field of data science, which has arisen as recently as 2016. It is now possible for businesses to use the wealth of data to fuel their operations. However, how does the utilization of data compare between a small-scale industry and a large-scale industry? Within the scope of this investigation, we will guide you through a selection of the most potent data science tools that are essential for small businesses in order to improve their operations and realize their full potential in the market.
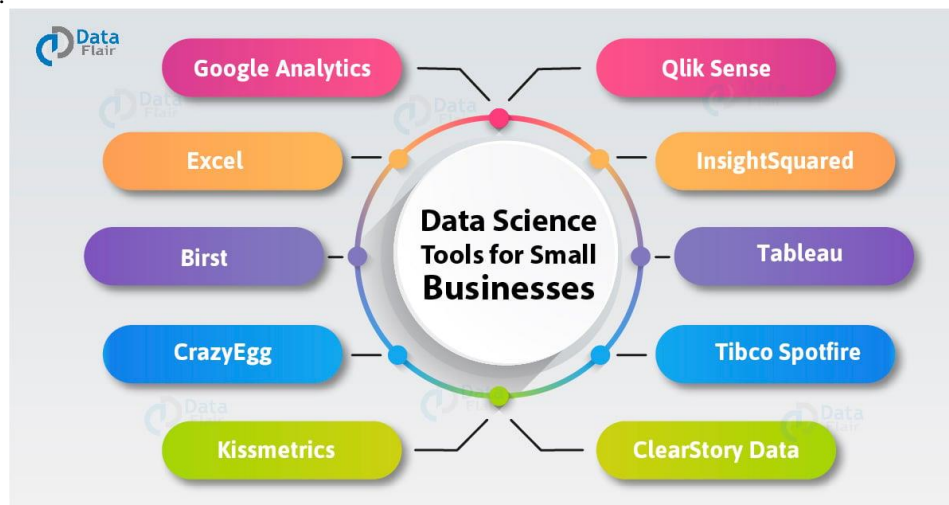

Figure 2: Data Science Tools for Small Businesses

Companies are utilizing a variety of data-related technologies in order to compete with one another for a greater sphere of influence. There is a wide variety of software that may assist you in maintaining your company's position at the forefront of the industry, allowing you to stay ahead of the competition. The utilization of tools, on the other hand, is contingent upon the size of your industry. The amount of data that is consumed, the number of events that are handled, and the size of the venture are the factors that we use to categorize firms as either small and medium enterprises (SME) or big scale enterprises.

There are four facets of data quality that contribute to the development of perspectives on data cognition and affect [13]. The initial phase is built upon these elements. These perspectives influence the model's intended perceived utility and simplicity of use as it progresses through the second stage of the technology acceptance model. Additionally, it was believed that the three main factors that prompted SMEs to implement a BIS were the attitude toward data cognition, the attitude toward data cognition affect, and the perceived utility and ease of use. Technological considerations, organizational issues, and environmental factors all stand in for these components. The incorporation of these elements results in the evaluation of the BIS prior to its implementation and actual execution.

The Adoption of Business Intelligence Systems in Small and Medium Enterprises in The Healthcare Sector

Business environments are becoming more dynamic as a result of the evolution of IR 4.0 and the introduction of COVID-19, both of which have had an impact on virtually every aspect of our day-to-day lives. Accordingly, in order to provide a prompt reaction to the competitive marketplace, firms require sophisticated breakthroughs in technical innovation [14]. During the mid-1990s, when the internet was widely available and technology was advancing at a rapid pace, BIS was introduced. Business intelligence systems (BIS) are widely recognized as an all-inclusive set of resources that help companies analyze massive amounts of data to find their strengths, areas for improvement, and potential new possibilities [16]. The Business Intelligence System (BIS) aids decision-making as an information system (IS) by controlling, collecting, and integrating both structured and

unstructured data; managing large databases like big data; providing solutions for ad hoc searches, forecasting, monitoring, and analysis; and supporting advanced computing technologies that end-users can use to discover new knowledge through processing, summarizing, screening, and combining data from various sources [17]. Business intelligence (BI) systems have been deemed one of the top technical goals by many decision-making bodies, including firm executives, CIOs, and executives. This is because technological developments in Big Data and hyper-competition are affecting modern business [18].

A comprehensive procedure that serves as the foundation for any research endeavor, the literature review contributes to the progressive advancement of scientific knowledge based on studies that have been conducted in the past [19]. Synthesizing literature reviews (SLRs) is a straightforward and reproducible way to answer research questions by incorporating and assessing all of the published information on the subject and synthesizing empirical data [20]. From a basic point of view, new information can only be expanded upon by expanding upon existing body of knowledge. If we want to know how far we can push knowledge, we need to know where those limits are. By reviewing all of the pertinent literature, we are able to both acknowledge the depth and breadth of the current body of work and pinpoint what needs additional research [21].

An essential addition to the significance of the research is made by this strategy, which tries to discover references that are pertinent to a subject that is being examined.

Several studies on IT adoption have shown that technical innovation settings are where much of the research is concentrated. An analysis of the literature on information technology adoption reveals this. What is meant by the technological aspect of adoption are the characteristics of both internal and external technology that might influence individuals or organizations [22]. The technical context encompasses both the internal and external technologies that are pertinent to enterprises.

These technologies have the potential to influence innovation "by demarcating the limits of what is possible as well as by showing firms ways in which technology can enable them to evolve and adapt." An organization's external technologies are those that are already available to the public but that it is unable to implement within. Important in determining whether or not to implement innovation, they set a high bar for how quickly and to what degree a company can adapt to new technology. The tools and methods that are already in use within an organization are known as its internal technology.

According to [23], when people want to understand how technological elements affect SMEs' adoption of technology, they usually look at the parts of the theory of diffusion of innovation (DOI). In a number of studies, these technological qualities were employed as criteria for determining the degree to which an organization had adopted information technology. Furthermore, [24] investigated the factors that influence the adoption of the smart farm in Korea by using these similar elements as their research base. According to these studies, these characteristics are significant for the adoption of technology. The results of the meta-analysis also lend credence to the idea that these factors have a substantial role in the spread of new IT developments.

Business Model Transition and Entrepreneurial Small Businesses

In the context of constantly shifting business settings, it can be difficult for small enterprises to innovate their business models (BMs) [25]. Academics focus their attention on business model innovation (BM), and more specifically on business model innovation (BMI), in order to gain a better understanding of this phenomena. As a consequence of this turn of events, the quantity of material that is currently accessible has increased at an exponential rate. In this conversation, the topic of discussion is whether or not small and medium-sized businesses (SMEs) that are undergoing digital transformation will perform better if they commit more resources for business model (BM) testing and engage more in strategy execution. Three hundred twenty-one European small and medium-sized businesses (SMEs) that are actively employing social media, big data, and information technology in order to develop their business models were the subjects of an empirical study that was carried out during the course of the research. Structural equation modeling also indicated that increasing the amount of resources given to business model experimentation and increasing the amount of participation in the practices of strategy execution has a positive impact on the overall performance of the firm. This was proved by the fact that both of these factors have a positive influence on the overall performance of the company.

BM experimental procedures and the innovativeness of the company were the mediators of these outcomes. Furthermore, the presence of equifinality was discovered through the utilization of fuzzy-set qualitative comparative analysis (fsQCA), which uncovered many configurations in which the antecedent conditions have an effect on the general performance of the organization [26].
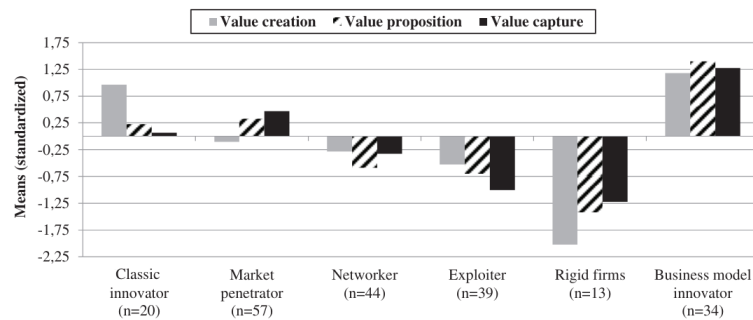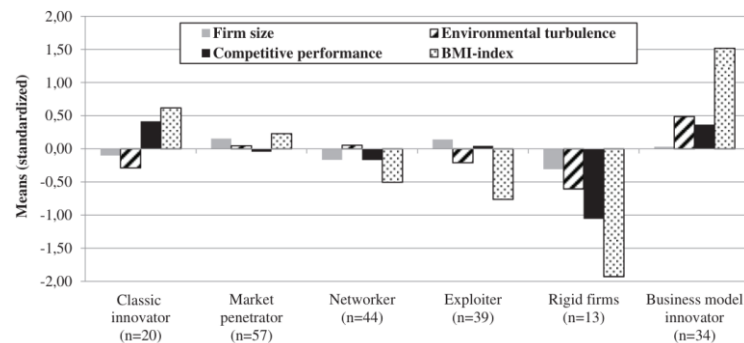
Figure 3: Differences in BMR (aggregated)

Figure 4: Covariates of cluster centroids

Due to the fact that they prioritize innovation in both their products and their operations, we referred to these kinds of businesses as classic innovators. These companies exhibit a variety of shifts in relation to the production of value (refer to Figure 3). When it comes to the implementation of new technologies as a component of value generation, innovators demonstrate the highest degree of performance across all companies. Despite the fact that they generate relatively few new revenue streams, traditional innovators also endure major shifts in the cost structures of their businesses. With regard to the variables, innovators are subject to a very low amount of market volatility; but, when it comes to competitive performance, they beat all other types (see to Figure 2 for further explanation). In general, companies that fall under the Type A category combine significant shifts in the process of value creation with a few specific subcomponents of value proposition and value capture. On the other hand, there is still a lack of an integrated framework that provides a systematic evaluation of the business models literature which are addressing BM and BMI [27]. This framework would help to take into account the resource limitations that are faced by small businesses at the same time. The study that has been given provides a comprehensive evaluation of the existing literature, proposes a framework for the integrated transition of business models (BMT), and establishes a flexible research agenda for future researchers. As a result, the study has been made available to the public.

Conclusion

The key topics that emerged from the literature sample are the following: business model innovation (BMI), external antecedents (change of environment and entrepreneurial ecosystem), internal antecedents (dynamic capacities, entrepreneurial orientation, resilience and strategy), and output (firm performance). To summarise, these results are the primary topics that surfaced during the investigation. A comprehensive analysis of the existing literature on business management theories, with a particular emphasis on small firms, is offered by the extended framework. After the analysis was completed, the disjointed lines of inquiry were then incorporated into a comprehensive framework that had a distinct emphasis on small firms that were run by entrepreneurs. In addition to shedding light on both internal and external antecedents, the BMT framework provides entrepreneurs with assistance on how to apply and finish BMT as part of their businesses. Case studies that are conducted in the future would be of great use to practitioners in a variety of industries in successfully managing BMT. The purpose of this paper is to provide an overview of information that is currently available on BMT theory. Additionally, the advancement of knowledge evaluation for the first integrated BMT techniques has been strengthened as a result of this study in recent years. This study offers academics the opportunity to get

significant insights in a variety of research topics by providing a solution to the research question using the BMT framework.

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