

Technology Factors, ERP System and Organization Performance in Developing Countries

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Abstract - This paper aims to explore a set of technological factors among the factors for ERP adoption by organizations in developing countries, especially in the context of Libya. The conceptual framework, and the factors and relationships proposed in the review process confirm the impact of the proposed framework. The discussion of certain factors with reference to particular countries have some common characteristics that unite their comparison in terms of the government sector. There are many similarities between the cultural, structural and technological factors considered. It is important to integrated these factors to determine their importance in a comprehensive study. The present paper proposes a methodological framework for the study of the most important factors, influencing the possible relationship between ERP system and performance in a clear signal that it has not been studied before in the Libyan context, directly giving the clear importance of such a study. This provides knowledge of their impact on ERP adoption and organizational performance, because it is considered a starting point for further studies in the Middle East and North Africa, especially in the context of Libya.

Keywords - ERP system, organization performance, Technology factors, developing countries, Libya

1. Overview of development countries

The key to ERP management tools of small, medium, and large organizations are important to consider [1], [2]. The momentum of the planning and selection help in the ability to successfully monitor and control organizations' resources (human resources, monitoring work flow, financial resources, stores, purchasing, information, etc.) and ERP, and in turn provide a platform to integrate all data into one concise environment [3].

Several studies [4]-[8] investigated a set of critical factors that might effect the adoption ERP in the view of Malaysian institutions.

These studies showed that most of the factors depend on the nature of the sector, as well as the size, age and the number of employees. Differences in technology also have a significant effect on the adoption and implementation of enterprise resource planning decisions. Some recent studies in Egypt, Jordan, Saudi Arabia, Dubai, and Bahrain, pointed out that, although these studies [9]-[15] confirmed that the major role impacts the performance of the institutions in the adoption of these factors, in the ERP process, there are certain factors that should be studied. This confirms that in the context of developing countries and the Middle East, there are still opportunities and factors that need more focus. Most of these studies emerged with focus on most of the technological factors. But some studies focus on cultural and regulatory factors.

In the context of Libya, there are many studies that have been done on information technology systems using different approaches. In adoption and implementation, these systems focus on many factors in the organizational context, including top management, leadership orientation, organizational culture innovation, business performance, accounting quality, etc. [16]-[27]. Although Libyan organizations started to adopt, implementation IS/IT systems in different periods in different areas of organizations, they are trying to improve their performance, especially in the vital sectors of the state, including services and productive organizations that provide the country a large proportion of income. Areas of technology greatly improve the development of these systems [28].

However, according to [29], [30], in the context of Libya, in front of large reform plans, for the development of infrastructure and the integration of information technology, the extent of cultural and technological factors affecting the adoption of such programs and infrastructure is currently being studied. It is becoming increasingly difficult to ignore ERP adoption in Libyan organizations. This study provides a summary of the evolution of this industry, and its institutional performance in Libya [31]. In different areas of organizations in Libya, these organizations are trying to improve their performance, especially in the vital sectors of the state, including services and productive organizations that provide the country a large proportion

of income. The payment of a lot of these organizations improve areas of technology and the development of systems that allow it in the future [28].

It is clear that the gap in information technology and the developed world is due to social, economic and political conditions that create challenges and obstacles, which can be classified into technological factors, cultural factors in the resistance to change, and lack of experience to use different techniques in some cases [16],[27]. In this aspect, this paper explores some of the factors that could affect the adoption of these systems in the pre-implementation phase to have a role in the development of the current framework by default in a subsequent study process.

2.Literature Review

2.1 Organization performance

ERP improves the overall performance of the organization (financial, fiscal and non- financial) [32], and increases the profitability of organizations [33], return on assets, operating income. Current research aims to take advantage of the adoption and implementation of ERP [34], [35], Standardization, and Competitive Advantage [36]. The current paper attempts to explore some of the advantages offered by ERP that are reflected on the organization performance.

2.1.1 Standardization

ERP imposes the basis of the strength of discipline and consistency in various service operations, and commercial and industrial institutions, in order to consolidate and simplify the processes of providing information to the employee and the manager. The recipient of the service all of the outputs and outcomes of the adoption of ERP [37], [38].

2.1.2 Profitability

Organizations that are looking for a profit in commercial and industrial operations seek to reduce the costs associated with the various operations to be able to achieve a return. This requires inventory control and control of delivery times to customers, and a supply chain management to the other service organizations also seeking to profit [39], [40]. Another method is how you can give customers the best service in the sense the extent of customer satisfaction with the service provided. All this requires rationalization and directing the workforce and pushing them to get more serious to help the success of the adoption of ERP to ensure the effective implementation and evaluation after the execution. All of this is reflected in organizations that have not adopted successfully ERP functions [41], [42].

2.1.3 Return on Investment (ROI)

Rate of return on investment often is linked and changes in understanding of the factors around the organization of environmental and technological divisions, whether that was such organizations provide services, or do business mostly through ERP applications, as previous studies have pointed [43]. One organization or different departments per organization or sub-sections of the organization aim to achieve the main goal of access to improved performance [44].

2.1.4 Competitive Advantage

Achieving a competitive advantage has become essential for organizations that are looking for significant performance [45]. ERP has become the determinant of competitive advantage for organizations around the world. The attention of organizations relying on different systems mean owning a real-time information, who owns the information and the ability to adapt to changing circumstances becomes a competitive advantage, despite the high cost of investment in ERP [46]. However, they have looked for ways to be able to adopt systems at the lowest cost and increase the effectiveness of using the system to search for alternatives to the high competitiveness [47]. On the other hand, ERP systems may not provide a competitive advantage when adopted directly, although the information provided by the faster processing of data and access to information at the right time [48].

This prospect suggests a problem in that it is difficult to see a sustainable competitive advantage that can be achieved by the organization of systems packages that can be obtained from any other competitor (cost, for example). This issue has created a debate about the possibility of the advantage of modern organizations in countries that are looking to adopt ERP to achieve some competitive advantages [49]. The results of [50] confirmed that the use of ERP provides necessary information for organizations, especially small and medium-sized ones, to handle uncertainty planning to offer a competitive advantage.

2.2 ERP system

ERP is one of the most important tools that can contribute to an increase in organizational performance through harmonizing the different processes, and enables better decision-making information [51]. [52] Identified that there are different methods to identify and define the ERP in a sense that looks to businesses and technical job perspective. [53] claim ERP is a readymade software that can run the basic structure and is full of information for various organizations, whether commercial, technical and functional organizations. It functions depending on the particular group.

From a technical perspective, ERP expanded MRP evolution in 1970. Also MRP II, which appeared in 1980, including at the beginning of 1990 appeared ERP and gained great importance where it became a system that supports organizations and administration to the resources in a single organization [54]. In terms of the functional role of ERP, it supports the organization, management, distribution of resources within each organization, including materials, and production capacity, and human effort, capital also, the backbone of integrated ERP solutions in various business and investment areas that are achieving return on capital [55].

According to [56], ERP is a "system uses software that enables any organization's effective use of resources efficiently (material and human resources, finance, marketing, accounting, costs, etc.), and thus provides integrated solutions to organizations in terms of information processing. It can be considered that a useful ERP converts large returns for organizations such as improving communication between departments in various business operations[57].

The successful adoption of ERP depends on the combination of various factors in all organizations, which differ from developed to developing countries [58]. Key elements must be included from the beginning and along the system's life cycle to ensure the success of the system's adoption and implementation [59],[60]. ERP has become among the most important topics that are controversial in many areas in which it was adopted significantly [61].

2.3 Technology factors

The technology infrastructure have up to 38.40% role in determining the success of ERP implementation [62]. In this respect, [63] pointed out that future studies should be achieved in an empirical manner to determine the technological factors identified (Relative advantage, Compatibility, Complexity, Trial ability and Observability), which affect the adoption of ERP. The results based on these factors are compared with the results of previous studies.

2.3.1 Comparative advantage

Comparative advantage is the degree of creativity and innovation that is characterized by a single organization from other organizations, in the sense that new ideas will replace existing ideas and give strength to the organization. Several studies [64], [65] have found that this variable gives a positive indicator for the acceptance and adoption of modern innovations of the organization, and is reflected on the information systems and the various associated systems, so as to improve the business, services and reduce operating and administrative costs associated [66]. These factors have become of value for the competition between the various organizations. They

make these organizations motivated to adopt new programs and systems.

2.3.2 Compatibility

Compatibility of innovation is defined as the degree of innovation that can be consistent with what is one single organization or department of the values and experiences of past and potential needs [67], [68], where a consensus can be specified. The most important element is to rely on the adoption of a system or a new technology in a single work [64]. This is due to resistance to change from employees to work as a natural reaction in the regulatory framework, which requires a study of the so-called compatibility of innovation. It is important to adapt the employees and workers to conform with changes in infrastructure, values and beliefs [69]. The technical compatibility with of innovation in an ERP environment is likely that specific software that already exists will be retained. It must be integrated with ERP, and thus is easier to integrate new information technology with retaining the existing systems, and this increases the chances of achieving organizational benefits [43].

2.3.3 Complexity

Complexity in IT organizations is defined as how to look for innovation. It is relatively difficult for some or all of the employees or workers find an issue when using complexity very often. It creates more uncertainty for the successful implementation [70], and thus increases the risk of accreditation. Decisions do not consider its subsidiary to be one of the most successful enterprises in the adoption of innovations factors [69]. The complexity inherent in ERP reflects how the system is relatively free of physical and mental effort, which could lead to the failure or success of adoptions. [68] claim that most of organizations that rely on business that provide ERP solutions will be suitable and lead to employee satisfaction, student service, customers and improve performance in case of adoption of successful systems [43].

2.3.4 Trial ability

Trial ability is the degree of innovation and creativity within the context of the experience of various businesses where the call to be connected in a positive way for the adoption of modern systems and innovations. [71] found that trial ability is positively related to e-commerce. Trial ability is also defined as the possibility of experience as a degree of innovation based on limited experience. [4], and [72] confirmed that is important in context of technological factors to adopt modern technological systems such as, XML, E-Commerce, Broadband Internet etc.

2.3.5 Observability

Observability is the degree of clarity and visible results to others [70]. It must be connected in a positive way to the adoption of innovations and the characteristics of the technology, because it has an impact on most of the small, medium and large organizations.

2.4 The underpinning theory

Current paper suggested to use the Technology, Organization, Environment Theory (TOE model) developed by Tornatzky et al. (1990) to determine the contexts affecting the adoption of e-commerce in the SMEs, and the other organizations. TOE framework of this theory is consist of three different main dimensions in influencing the reliance, are context of technological decisions, organizational context, and environmental context, where technological innovation is the internal and external technology that has organization. proposed factors that could affect adoption of ERP (technology, the organization will use the general framework, the environment) to understand the success of the adoption of system through the characteristics of the environment in the Libyan organizations [86].

3. Research Methodology

The methodology of this paper is based on causal research design, to investigate the proposed framework which was indicated in the previous literature, and provide clear insight in next future empirical study, to know whether any affect of the technology factors on the relationship between ERP and organization performance.

4. The conceptual framework

The suggested conceptual framework presents the proposed relationship between key variables, to fill the literature gaps identified in the preceding [38], [73], this study as a part of a practical easier method to investigate the following questions and build a hypotheses to support the main idea of the paper and investigate it using theories (Technology,. The organization, environment, resources theory and other possible theories:

1. What is the impact of technological factors on the success of the adoption of ERP and performance of organizations in developing countries?
2. Do the technological factors vary in influencing the relationship between the adoption of enterprise resource planning and performance of the organization as a variable moderation?

To answer these questions, a theoretical model has been developed based on two theories, namely, innovation theory and the theory of resources. Figure 1 depicts this model.

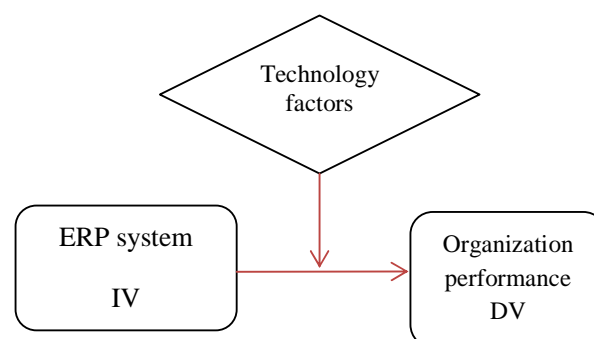


Figure1: shows the conceptual framework of the paper

5. Discussion

5.1 ERP adoption system and organization performance.

Several studies have examined and addressed the concept of underlying systems, and suggest that organizations depend mostly on ERP applications where it can be utilized to maximize the benefits [39]. On the other hand, [74] confirmed that ERP supports all business and internal activities of the organization, through integration of the functions of various business units of the organization. One or several areas where the company provides complete information leads to effective decision- making [75]. The same results are confirmed by [41], [76], who claim that an ERP system is the consolidation of all sections and departments to enable organizations to address all commercial activities such as logistics, supply and administration to resources, production planning, etc. The deployment of a single unit by organizations that use ERP can improve performance [76].

H1: There is a positive relationship with ERP and a significant affect on organizational performance.

5.2 Organizational technology factors and organizational performance.

In recent years, interest in the quality of service has become of great interest and is ever-increasing by practitioners and researchers in the modern business environment [77]-[79], because it is an important factor in the development of information systems and applications of modern factors [80]. Technology factors are found to be the best elements to enhance the level organizations performance. One particular study [81] stressed that information technology enhances an organization's performance by technology systems [82], [83]. Therefore, we formulate the next hypothesis:

H2. There is a positive significant relationship that affects the relationship between organizational technology factors and organizational performance.

5.3 Organization technology factors on the relationship of ERP system and organizational performance

One prior study [84] claimed that investment in information technology would bring benefits, whether tangible or intangible, including the impact on performance through the introduction of modern technology. As long as several studies have investigated ERP's different aspects, implementation of ERP [58], [85], and other post-implementation, also works in the factors that could affect these relationships differed between relationships direct variables, and indirect relationships between (moderate mediate variable). These are mentioned in order to compete to exploit the essential competencies of the available resources, which makes it possible to obtain better performance.

H3. Organizational technology factors attribute a positive moderating effect on the relationship between ERP system and organizational performance.

6. Implications

Despite the possibility to exploit the resources in Libyan organizations to ERP adoption, there are some technology factors used in order to improve performance. But the success of the efficiency and effectiveness requires good administration and high culture and infrastructure that contribute to support the success of new applications. These change strategies according to what fits the success of the projects and survival in the event of what supporting the continuity of these organizations in providing better services and performance. It was noticed that most organizations fail in the field of technological change, mainly because of the inability to control the important factors and opportunities.

From a practical perspective, the implications and consequences of the role of technology factors on ERP

and performance in Libyan organizations could contribute significantly to achieve the level of performance excellence compared to what really exists. The introduction of modern technology in organizations to facilitate the process of transition make use of them to achieve competitive centers that are clearer and more specific.

7. Expected contribution

This paper intended to provide the presented conceptual framework, and aimed by answer some important questions and hypotheses that presented most important factors associated with technology and its relationship to the business planning and performance resources in the context of developing countries. Libya was a case as one of the countries seeking to achieve the high performance levels in various areas of the organizations. It is possible to structure this study in the integrated process methodology scientific research paper that will enrich the work, where the ERP can be effective if it is adopted with success in improving the organizations' performance.

8. Conclusion

The paper dealt with a several quick glances of developing countries that have common denominators and different nature in the environment, which have adopted and implemented ERP in most organizations, and are still expanding input operations. Some studies that addressed both the performance of organizations and some of its variables, the adoption of ERP, and technological factors. The importance of knowing technology variables on the relationship between ERP and the performance is the important issues for the success of the system adoption process, it is seems to be new direction need more investigate, this requires an awareness of this phenomenon and further study of the expansion of knowledge in the practice of several factors in addition to the existing factors (eg, cultural and structural).

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