



Explaining the Competitive Advantage of Enterprise Resource Planning Adoption: Insights Egyptian Higher Education Institutions

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Abstract

Organizations nowadays focus on, not implementing ERP systems, but also leveraging ERP systems as part of their digital strategy. They holistically address people, processes, and technology for a digital transformation. Meanwhile, higher education institutions (HEIs) are also facing an imperative need for the implementation of modern technologies to stay competitive and differentiate them as an innovation leader. Higher education management is challenged with maintaining high-level information systems. These systems can generate complex real-time reports for effective resource allocation and better decision making. Enterprise Resource Planning (ERP) systems can help HEIs manage their resources and operations effectively. A study of ERP among 112 HEIs in Egypt was conducted. This study originally investigates the Egyptian HEIs' perception of the ERP system as a new integrating tool for its value. The results showed that Egyptian HEIs are still at the embryonic level as the majority have not adopted these systems yet. However, ERP value has been undoubtedly perceived by HEIs' managers. Therefore, the present study fruitfully reflected HEIs' understanding of the imperative need of ERP systems as strategic systems for their competitiveness. Consequently, the study suggests that Egyptian HEIs and ERP vendors take steps to remove any barriers and accelerate the ERP adoption process. Also, this research contributes to the advancement of ERP concepts and characteristics from HEIs' standpoint and a grants practical verification to the higher education context. Overall, the study advances existing knowledge and research on ERP, strategic management systems, and HEIs.

Keywords: Higher education, HEIs, ERP, Competitive advantage, Perceived value, RBT.

Introduction

ERP systems play a significant role in most large industries. Recently, HEIs have captured the advantage of the ERP system to offer students, faculty, staff, and stakeholders a better service and subsequently increase their competitiveness (Rabaa'i, 2009; Rabaa'i, Bandara, & Gable, 2009). The ERP system integrates all facets of business operations that allow a wide range of information for the decision-making process (Feldman, Shah, Chapman, Pärn, & Edwards, 2017). Such an important ERP system, invested by organizations, is crucial for competition if it significantly affects organizations' competitive advantage (Bett, 2018; Bhat, Shroff, & Bandi, 2013; Débrosse-Bruno, 2017; Soliman & Karia, 2017). Despite ERP systems advancing operational efficiency and competitive force, not many HEIs have embraced them (Abdellatif, 2014; Karia & Soliman, 2017).

Higher education (HE) in its nature is continuously changing due to the emergence of advanced technologies and globalization. Most HEIs of different sizes and types are in a struggle to compete by enhancing their technological capabilities. Moreover, the higher education industry today is heavily dependent on the global development of information technology (IT) due to the government's call to improve its performance and efficiency. Fast-moving advances in IT have reshaped how universities undertake their administrative practices. Also, the competitive educational environment and the expectations of the stakeholders globally are forcing universities to improve their overall performance (Khalid et al., 2018). Recently, there have been many changes to the scene of the higher education sector, including government funding reduction, growing demand for higher education, changing demographics, new models of higher education, economic development and growth, technological advance in information communication technology (ICT), and changing government regulations. However, HEIs have attempted to achieve a competitive advantage for shaping their strategic policy direction in the face of these changes (Mathooko & Ogutu, 2015).

On the complexity of the competitive context of HEIs, the ERP system is significant for HEIs' sustainable performance. Nonetheless, HEIs or organizations still are not convinced with the ERP system as a source of emerging innovation capability that will improve operational performance and service efficiency. Karia (2018) reveals the importance of technology resources to influence firms' competitive advantage towards moving in the Industry Revolution 4.0. This sight implies that the ERP system is a valuable resource-capability just for a competitive advantage. Therefore, the research concerning ERP role and its value is crucial for the ERP adoption and sustained competitive advantage.

In general, Porter (1998) indicates that technology is the means through which an organization can achieve a competitive advantage. Similarly, HEIs invest in ERP systems to improve the overall institution's efficiency and to realize the benefit of the competitive

advantage (Soliman, Karia, Moeinzadeh, Islam, & Mahmud, 2019). For decades, ERP system has been acknowledged for achieving competitive advantage; nevertheless, the ERP literature shows the mixed evidence about the expected values from these ERP systems in HEIs (Helo, Anussornnitisarn, & Phusavat, 2008). The reviews indicate that the perceived value of the ERP system is inconsistent and inconclusive that delays the ERP adoption. What HEIs need is further justification for the ERP role and its benefits for enhancing the ERP adoption.

Though there is evidence of ERP benefits, a recent study conducted by Terminanto and Hidayanto (2017) indicates that ERP implementation has a high failure risk of 72%. Many firms have not convinced the system due to 70% of ERP system implementation has failed to provide the expected values (Soliman, Karia, Moeinzadeh, Fauzi, & Islam, 2017). This finding explains why the ERP adoption is albeit slow. Furthermore, it was found that the researches on the existence of tangible evidence of the expected value of ERP systems in HEIs are immature and limited (Rabaa'i et al., 2009; Xu & Quaddus, 2013; Zare Mehrjerdi, 2010). However, Panorama Consulting Solutions, as an ERP expertise, recently reported the ERP success rate was 42 percent among the manufacturing, education, and distribution institutions. Accordingly, it is a significant achievement and should be a consideration, particularly in the early stage of planning an ERP adoption (Panorama Consulting Solutions, 2018). The existent study, hence, is lack of insightful knowledge about the successful framework in implementing ERP in HEI and its role and benefits in enabling a competitive force.

Due to the uncertainty of the perceived value of ERP, large financial investment, and ERP system implementation risk, managers or leaders in HEIs need a holistic view of the new ERP model. HEIs seek for tangible evidence on what aspects determine ERP perceived value (Ifinedo, 2011; Seo, 2013). Moreover, this study finds four shortcomings in the ERP literature. First, the study of ERP implementation in HEIs remains immature and limited observations. The knowledge of ERP aspects, its values, and its effects are still insufficient. Also, the studies on ERP perceived value and organizational performance still imperfect. Finally, the theoretical framework for the holistic view of the new ERP model is yet to be recognized.

The paper presents some novel contributions. First, the study successfully presented the HEIs current status of ERP adoption, which is still unidentified in literature. It found that Egyptian HEIs are still at the embryonic level since the majority have not adopted these systems yet. Also, the study confirmed the perception of ERP value among HEIs. That means they understand the imperative need of ERP systems as strategic systems for their competitiveness.

Moreover, the study develops a theoretical framework of the new ERP model for HEIs. It provides an insightful understanding of the influential factors empowering ERP perceived value, which in turn enhances competitiveness. Finally, this research contributes to the advance of ERP concepts and characteristics from the HEIs' standpoint and grants practical verification to the higher education context. It advances existing knowledge and research on ERP, strategic management systems, and HEIs.

Egypt Scenario of ERP System

In Egypt, the pharmaceutical sector is the significant ERP market because of its financial capacity as well as its complex manufacturing procedure (El Sawah, Abd El Fattah Tharwat, & Hassan Rasmy, 2008). Moreover, there is a lack of empirical understanding in implementing ERP systems (Mohamed, 2015). Only a few studies investigated ERP system success factors and expected value without any certain attention of the higher education sector (H. J. Abdellatif, 2014).

Moreover, HEIs in Egypt have faced some issues because of the absence of ERP systems. For instance, lack of integration of their business processes leading to asynchronies in their databases, work duplications, ineffective resources allocation, lack of campus-wide integration on a single platform, difficulty of providing accessible and user-friendly students' supporting services, growing dependence on paperwork and manual procedures, Loss of data integrity, validity, and reliability, difficulty to produce meaningful reports for decision making, problems of assuring information security, and excessive loss of time and cost, (Soliman & Karia, 2016). However, the ERP system, with its database that can be shared with the same accuracy, can contribute to mitigating the effects of such problems.

Therefore, the Egyptian Cabinet's Information and Decision Support Center (IDSC) declared a cooperation initiative, including the application of ERP systems to the Egyptian HEIs. IDSC, as an eminent think tank in Egypt, mainly aims to support the decision-makers to foster economic, social, and political development. This initiative provides several e-services for the HEIs by supporting the electronic link between the branches of the HEI that are located in more than a geographical range. Also, it provides the staff and students with electronic correspondence, discussion, and self-education. For instance, IDSC launches the application of the institutional electronic memory system "EMS" at the University of Banha in Egypt by providing training to its staff on how to use it. EMS is the specialized government system for effectively managing enterprise resources and capabilities at a high technical level for transforming data into knowledge, strategic planning, and decision-making. Moreover, IDSC attempts to improve relations among Egyptian ministries and government agencies by focusing on electronic information dissemination to measure society's attitudes towards national issues (IDSC, 2017).

Theoretical Background

The insightful reviews show evidence of some important findings. In general, most ERP studies covered different firm sizes of small and medium enterprises (SMEs) (Haddara & Elragal, 2013; Ruivo, Oliveira, & Neto, 2014; Shahawai, Hashim, & Idrus, 2014), multinational corporations (El Sayed, Hubbard, & Tipi, 2013; Supramaniam & Kuppusamy, 2010a; Zhu, Li, Wang, & Chen, 2010), to a mixture of firm sizes (Abdelghaffar, 2012) and different industries (Débrosse-Bruno, 2017; Haberli Jr, Oliveira, & Yanaze, 2017; Pan & Jang, 2008). This study finds the application of ERP systems mostly in large organizations (Abdelghaffar, 2012), and concentrating more on the implementation and post-implementation phases rather than the pre-implementation phase (El Sayed, 2008; El Sayed et al., 2013). In this line, Nazemi, Tarokh, and Djavanshir (2012) show that ERP literature focuses on issues related to the implementation phase of the ERP lifecycle because most organizations are in the implementation phase.

Previous ERP literature suggests factors influence ERP success (Abdelghaffar & Azim, 2010) and the business performance of ERP (Elragal & Al-Serafi, 2011). Nevertheless, the research on ERP system success factors and perceived value is limited and fragmented (Abdellatif, 2014). Only a few scholars have an interest in the ERP systems in the higher education sector (Al Kilani, Adlouni, Al Ahabbi, & AL-Yahyaei, 2012; Soliman & Karia, 2015a).

The ERP perceived value is the value-added of technology, the benefits of technology implementation, or the effects of technology capabilities (Almahamid & Awsi, 2015; Uwizeyemungu & Raymond, 2012). Technology or ERP system should have the capacity to increase business effectiveness as promised. Without such capacity, firms incur the risk of expenses associated with implementing technology (Richey, Tokman, & Skinner, 2008). Therefore, the ERP perceived value should be able to measure as promised, as it causes a positive impact on the decision to the ERP adoption (Al-Jabri & Roztock, 2015).

Sustainable HEI depends on its innovation capability that creates value to the HEI's competitive advantage. Karia and Asaari (2016) reveal the resource-capability configurations as the determinant of a firm's innovation capability. In line with the resource-based theory (RBT), this study views the ERP system as an emerging innovation capability developing a resource-capability configuration. Therefore, the ERP system produces a positive impact on HEI's performance and competitiveness.

Previous studies fail to show ERP perceived value affects competitive advantage and the extent to which such influential factors can affect ERP's perceived value. This insight shows evidence of the ERP system yet to be perceived by HEIs as an emerging innovation capability for improving HEIs' operational performance and service efficiency. Due to limiting belief, the ERP system adoption in HEIs is still at the low adoption rate of the pre-implementation stage.

To conclude, the ERP system and its capability in HEI are crucial for sustainable HEIs. In other words, the expected benefits from ERP systems investments in HEIs are vital for enhancing the adoption of ERP systems in HEIs. Specifically, the research on influential factors of ERP perceived value in HEIs is timely for increasing the adoption rate of the ERP system.

ERP Operational Model

In brief, ERP is rather new in the field of higher education sector research. A major gap in ERP knowledge is the absence of a theoretical framework to operational model to increase the adoption rate of the ERP system. Since technology or ERP investment is expensive and risky, HEIs should concern more about the ERP perceived value in order to exploit their operational efficiency and competitive advantage. However, the current study highlights that the ERP perceived value in HEIs is incomplete. The adoption of ERP is rather low due to the ERP implementation failed to provide the expected value of the ERP system. ERP scholars suggest other different factors of ERP perceived value a single, integrated model, stronger or standalone model (Catherine & Abdurachman, 2018; Hung, Hung, Tsai, & Jiang, 2010; Mohamed, 2015; Ruivo et al., 2014; Xu, Ou, & Fan, 2017).

Most ERP literature includes technology, organizational and environmental factors which are significant to the success of ERP implementation (Bradford & Florin, 2003). Also, literature refers to the post-implementation (maturation stage) success and the causal effect on the ERP user satisfaction (Supramaniam & Kuppusamy, 2010b; Zhu et al., 2010) and post-implementation ERP use and value (Ruivo et al., 2014; Ruivo, Rodrigues, Johansson, Oliveira, & Rebelo, 2016). In other words, the firm's internal and external factors remain critical factors in the information system adoption process within firms (Arpaci, Yardimci, Ozkan, & Turetken, 2012).

The term "perceived value" is a salient concept of forming users' attitudes towards information systems (Kim & Kankanhalli, 2009). The importance of perceived value is significant since it presents to several positive outcomes, like a high degree of behavioural intention to use IT/IS (Seol, Lee, & Zo, 2016) and perceived usefulness (Chen & Lu, 2016). The term "ERP perceived value" or "ERP value" interchangeably used, refers to a concept of intangible value, exploiting from the ERP system application. The perceived value of the system measures the system's effectiveness according to how it improves and supports job performance and business objectives (Bernroider, 2008).

Based on reviews, this study operationalizes the influential factors of ERP perceived value into the resource-capability configuration. Technology, organizational, environment (TOE) (Ruivo et al., 2016) and technology readiness (Pan & Jang, 2008) are considered as influential factors of ERP perceived value in the ERP setting. In line with Tornatzky,

Fleischer, and Chakrabarti (1990), TOE factors are the main dimensions for the success of different types of information system innovations. TOE framework has been used to study IT adoption, and IT implementation success in organizations (Dwivedi, Papazafeiropoulo, Ramdani, Kawalek, & Lorenzo, 2009; Hsu & Lin, 2018; Puklavec, Oliveira, & Popovič, 2018; Wen & Chen, 2010; Xu et al., 2017; Zhu et al., 2010).

Resource-based ERP

In brief, the study seeks to research the extent to which the different influential factors can affect ERP's perceived value. Meanwhile, this research is different from previous studies and limited in HE sectors. The firms' perceived value of an ERP system is crucial for obtaining the benefits of the ERP system and sustained competitive advantage

The reviews reveal the theory-driven empirical evidence for the insight ERP perceived value is imperfect. Kalling (2003) claims that less research uses RBT of the ERP systems concerning competitive advantage. Therefore, only a few ERP studies applied RBT to explain the relationship between ERP system, organizational performance, and competitive advantage (Beard & Sumner, 2004; Soliman & Karia, 2015b; Stratman, 2007). Despite extensive ERP research, this research is different from the previous study and limited in HE sectors.

Competitive advantage is enhanced when combined with valuable, rare, inimitable, non-substitutable, and complementary resources. Karia (2018) states that technologies serve as a temporary competitive advantage since technologies are easy to be owned by other competitors. Accordingly, technology cannot be considered as the potential source for sustained competitive advantage. Therefore, in the long term, Penrose (1959) argues that resources lead to firm performance. However, superior performance is attained when the value of the resources is maximized through the development of firms' innovation capability. Karia (2018) indicates that technology resources can cause superior performance by provoking the value of resources into innovation capability or by acquiring and developing the value of the resource. Such a capability is causally ambiguous and, therefore, difficult to be imitated and substituted by competitors.

According to RBT, capabilities are commonly defined as bundles of individual skills, assets, and accumulated knowledge exercised through organizational processes (Amit & Schoemaker, 1993). Day (1994) further notes that capabilities enable a firm to carry out activities necessary to move products/services through the supply chain, creating sustainable competitive advantages. From a strategic perspective, without effective firm inputs (e.g., perceived value, readiness, knowledge, learning), other resources cannot be deployed for competitive advantage (Glenn Richey Jr & Autry, 2009). Meanwhile, a firm's innovation capability depends on a firm's resources and capabilities to cause superior performance (Ray, Barney, & Muhanna, 2004). In other words, firms with greater resources will not cause economic profit if they fail to acquire innovation capability. According to Chang, Hwang,

Hung, Lin, and Yen (2007), adequate resources are also critical to the success of technology adoption.

This study proposes the resource-based ERP for a new ERP model suggesting an ERP system as a firm's tangible and intangible resources and capabilities that enable competencies. Therefore, ERP systems are more likely to have positive impacts on organizational performance. Hence, the performance of an ERP-based firm is enhanced through resource-capability configuration. An effective ERP system, hence, enhances innovation capability. The perceived value of ERP systems is an innovation capability enabler for automating business processes and enabling process changes. In other words, the ERP perceived value, hence, is the benefits of the ERP system, an emerging innovation capability providing an excellent business process, and subsequently determining a firm's performance and competitive advantage. According to the RBT, ERP perceived value empowers a more positive effect on performance, and it becomes the source of sustained competitive advantage (Barney & Clark, 2007).

Specifically, the ERP systems are HEI's resource-capability configuration that enables competencies in the HEI's innovation capability. For examples, ERP systems can provide data processing efficiency or data maintenance accuracy, which is essential for HEIs to control activities and support the business process. The ERP perceived value is an emerging innovation capability enabler for automating the university business process and enabling process changes. The innovation capability of HEI achieved through structured and integrated resources and capabilities, which, in turn, determine HEI's operational performance.

In conclusion, the ERP system is expected to provide strategic benefits. ERP can improve university image, internal efficiency, quality educational service, and the relationship between university, staff, and students. The study refers to ERP perceived value as HEIs' innovation capability caused by ERP system capability, accessibility, and availability leading to HEIs' sustainable performance and competitiveness.

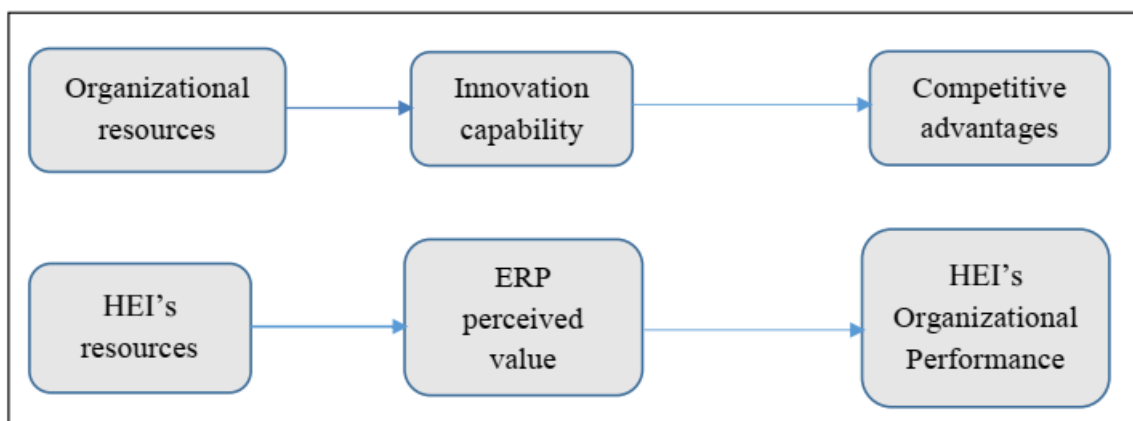


Figure 1. Resource-based ERP

Methodology – interview HEIs case

Participants

The Egyptian HEIs are categorized by the Egyptian Supreme Council of Universities (SCU) into 231 HEIs (SCU, 2019) as follows:

- 28 public universities
- 36 private universities
- 143 private higher institutions
- 10 public technical colleges
- 14 public technical health institutions

The study randomly investigated HEIs in Egypt to indicate their perception of the ERP system as a new integrating tool for its value and benefits. A total of 112 HEIs out of 140 ones were returned the completed questionnaires, indicating an 80 percent response rate. The unit of analysis of this study was the IT manager for each HEI. That is due to IT managers' awareness of their HEIs' strategies, needs, and challenges that can determine their perception of the ERP value. Also, IT managers are aware of their institutions' technical resources plus the issues of their current systems (legacy or standalone systems) as well as the expected benefits and the potentials of implementing the new systems (Zhu et al., 2010). Therefore, they are more likely to show their institutions' readiness to employ a strategic information system like an ERP system. Moreover, their technical background, high level of education, IT knowledge, IT work experience, IT status of the competitors locally or globally, and IT market advancements are making them the best informants to perceive the value of the ERP system (Boonstra, 2013).

Research instrument

The present study applied a self-administered questionnaire in collecting the data where the respondents read the survey questions and record their responses without the presence of a trained interviewer. This method allows the respondents to complete the questionnaire at their own time and look for further information when necessary. Also, it helps the respondents stimulate their interest in completing the questionnaire through interaction between the researcher and respondents (Hair Jr & Lukas, 2014).

Perceived value refers to a nonmonetary value of derived benefits within the organization. It is measured by a three-item scale adapted from Klöcker, Bernnat, and Veit (2014). Organization judges the value of the system according to the job performance of its employees as well as increased productivity, quality, and competitiveness (Bernroider, 2008; Kotler, Keller, Brady, Goodman, & Hansen, 2009).

A questionnaire was prepared to investigate the IT managers' perception of ERP systems as a new integrating tool. They were requested to fill the questionnaire, which includes several kinds of questions. Initially, a seven-point Likert scale consisting of 3 statements was designed to determine their perception of ERP Perceived value. Similar studies used the Likert scale to assess perceptions of the respondents towards ERP systems (Dwivedi et al., 2009; Pan & Jang, 2008; Puklavec et al., 2018). Then, a closed format question was applied (e.g., "What is your opinion of the ERP system as an integrated system for your organization?"). Previous studies have used this type of question format to determine the status of ERP adoption (Puklavec et al., 2018).

Table 1. Demographic Information

i. HEI's Profile	Frequency	Percentage
HEI type		
Public university	17	15.2
• Private university	20	17.9
• Private higher institution	63	56.3
• Public technical college	6	5.3
• Public technical health institution	6	5.3
Number of employees		
<100	11	9.8
101-1,000	86	76.8
1,001-10,000	11	9.8
>10,000	4	3.6
ii. Respondents' Profile	Frequency	Percentage
Gender		
Male	100	92.6
Female	8	7.4
Age		
20:30	6	5.5
31:40	21	19.1
41:50	34	30.9
51:60	49	44.5
Educational level		
Degree	13	11.7
Master	34	30.6
PhD	64	57.7
Working experience in this organization		
< 5 years	16	14.3
5 - 10	34	30.3
>10	62	55.4

Cronbach alpha is a statistical analysis measure used to calculate the coefficient for internal consistency reliability for any scales. In general, the accepted lower limit for Cronbach's alpha is 0.70 (Tavakol & Dennick, 2011), which is regarded as satisfactory reliability. The results of the reliability analysis are given in Table 2. The questionnaire constructs are reliable as measurement instruments.

Table 2. Reliability of Measurements

Factor	Number of items	Cronbach's alpha
ERP Perceived value	3	0.934

Results

This study used the Statistical Package for Social Science (SPSS) version 26 to code and analyze the collected data.

Results from Likert Scale Items

Table 3 illustrates the percentages of the descriptive statistics for the perception of ERP perceived value among Egyptian HEIs. This study adopts a seven-point Likert scale, including "strongly disagree" (1), "strongly agree" (7), and "neither agree nor disagree" (4) to collect the data (Eutsler & Lang, 2015).

Table 3. Descriptive Statistics for the Questionnaire Items

Items	Strongly Disagree	Disagree	Slightly Disagree	Neither Agree nor Disagree	Slightly Agree	Agree	Strongly Agree	Total
ERP Perceived Value								
Considering the time and effort to spend, the change to the new way of working with an ERP system will be worth.	0 0.0%	0 0.0%	4 3.6%	37 33%	41 36.6%	26 23.2%	4 3.6%	112 100%
Considering the loss to experience, the change to the new way of working with an ERP system will be a good value.	0 0.0%	0 0.0%	2 1.8%	37 33%	40 35.7%	29 25.9%	4 3.6%	112 100%
Considering the hassle to experience, the change to the new way of working with an ERP system will be beneficial.	0 0.0%	0 0.0%	4 3.6%	26 23.2%	37 33%	39 34.8%	6 5.4%	112 100%

Table 4 shows the standard deviation of the collected data. The standard deviation as a statistical measure describes how the data disperse around the mean. A large standard deviation refers to farther data from the mean, demonstrating many variations in the answers. However, smaller values of standard deviation designate data are close to the mean signifying similar responses. A standard deviation value becomes 0 when all responses are the same (Fielding, Gilbert, & Gilbert, 2006). The range of standard deviations values (in Table 4) is between 0.90 and 0.94, indicating that responses are comparatively similar.

Table 4. Mean and Standard Deviation of the Questionnaire Items

Items	N		Mean	Std. Deviation
	Valid	Missing		
ERP Perceived Value				
Considering the time and effort to spend, the change to the new way of working with an ERP system will be worth.	112	0	4.90	0.92
Considering the loss to experience, the change to the new way of working with an ERP system will be a good value.	112	0	4.96	0.90
Considering the hassle to experience, the change to the new way of working with an ERP system will be beneficial.	112	0	5.17	0.94

The study arranged three questions to describe HEIs' perception of the ERP perceived value. The mean values of their responses are satisfactory, indicating a good perception of ERP value. The first two questions indicate that most of them have undecided yet. The third question shows a significant finding with mean scores above 5, which nearly equals to agree. Accordingly, ERP value has been undoubtedly perceived by HEIs' managers. HEIs illuminate their perception of the ERP value since the change of working will be worth (mean= 4.90), this change will be a good value (mean= 4.96), and it will be beneficial with an ERP system (mean= 5.17). As a result, HEIs' responses indicate a positive perception of ERP systems as a value demonstrating a substantial finding, which is rather agreed upon.

Results –Obtained from closed format questions

This study applied the Statistical Package for Social Science (SPSS) Version 26 to code the collected data. Figure 1 illustrates Egyptian HEIs' opinion of the ERP system as 46.43% of them believed that an ERP system is ('a good idea and they would like to use it'). This finding is in line with Badewi, Shehab, Zeng, and Mohamad (2018) and Almahamid and Awsi (2015). However, 33.04% considered ('it is a good idea, but they would not like to use it'). This finding indicates that although the ERP system is significant for HEIs' sustainable

performance. However, they are still not convinced of the system as a source of emerging innovation capability that will improve their operational performance and service efficiency.

On the other hand, 20.54% of them considered ('do not think it is a good idea'). This finding confirmed HEIs are not concerned with ERP adoption. This issue needs to be considered by the researchers to determine the ERP adoption factors that may affect HEIs' decision to use these systems, particularly in the pre-implementation stage.

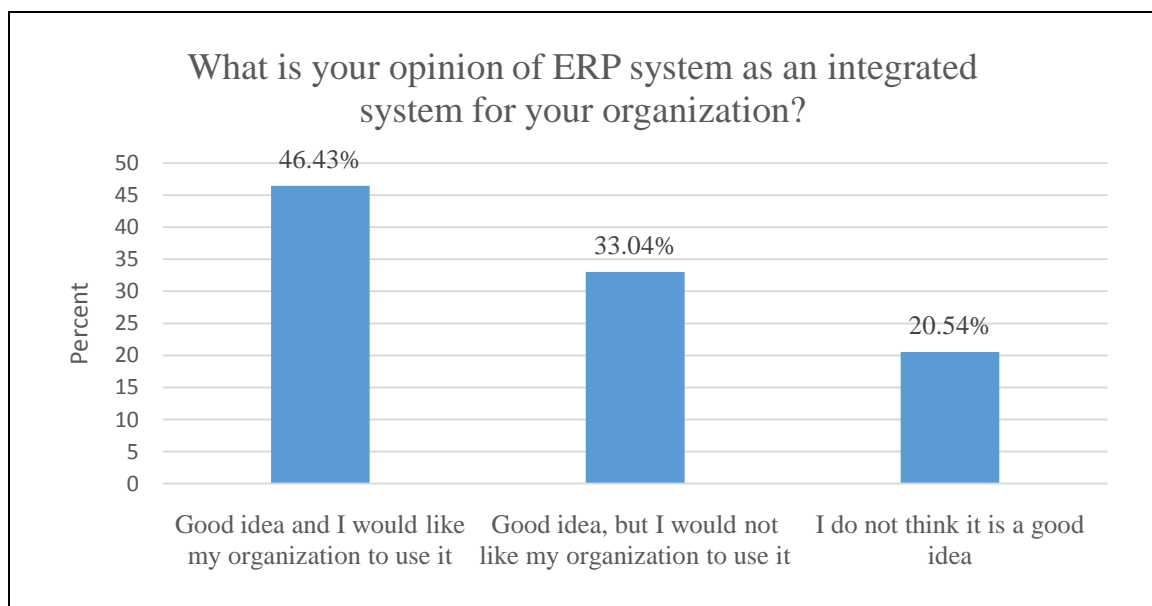


Figure 2. Egyptian HEIs' opinion about ERP systems

Overall, the results reveal that some HEIs positively perceived ERP value. However, a high percentage of them show no interest in adopting these systems. Consequently, Egyptian HEIs and ERP vendors should take steps to remove any barriers and accelerate the ERP adoption process.

Discussion

The purpose behind studies on ERP in the higher education setting is to improve the understanding level about ERP systems, to get a better appreciation of the substantial change required as well as considering the ERP adoption itself. Therefore, the ERP adoption relies on the HEIs' understanding of the ERP perceived value. The perception of the ERP value and benefits encourages HEIs to adopt ERP systems. Consequently, the study findings indicate the positive attitude by most HEIs to adopt ERP systems. They need to adopt ERP systems to increase their organizational performance and stay competitive. As the HEIs are being met with significant challenges, the ERP system introduces new techniques and tools that can provide tailored solutions to such problems. The integration characteristic of the ERP system

is a keyword that guarantees a comprehensive solution for all HEIs' issues. As leading to a principal change of business processes within HEI, the pavement should precede the ERP adoption. This view could be done by highlighting the goals behind ERP adoption to HEIs' leaders and managers to secure a successful ERP implementation. Besides, the results reveal that a high percentage of HEIs have not yet employed ERP systems. However, they are aware of ERP value and benefits. That might be because of high failure ratios indicated by other ERP adopters in different contexts. Therefore, many HEIs have not convinced the ERP system due to its failure to provide the expected targets. This finding explains why the ERP adoption among HEIs is albeit slow.

Furthermore, it was found that the literature on the tangible evidence of the expected value of ERP systems among HEIs is immature and limited. This issue needs to be considered by researchers to determine the factors that may affect the decision to adopt ERP technology for competitiveness purposes. Also, this research has attempted to investigate the actual impacts of ERP systems on HEIs' competitive advantages by referring to the ERP perceived value of RBT insight. Thus, the perceived value of ERP systems becomes one of the most significant factors in creating HEIs' competitiveness. As such, this notion should be given substantial attention in order to more fully understand the ERP technologies and how these technologies can create competitive advantages.

Conclusion

In the light of HEIs' need to implement modern technologies for their digital strategy transformation to stay competitive, this study investigated the HEIs' insights about their ERP perception. The study revealed a positive attitude from them to the ERP benefits and value. They supported the idea of utilizing ERP systems because it helps them integrate their business functions to allocate their resources and better decision making effectively. However, this research reveals that the majority of HEIs have not adopted ERP systems yet. Hence, more efforts are needed to determine the ERP adoption factors that may affect their decision to adopt these systems, particularly in the early stage of adoption.

Moreover, this study advances the theoretical ERP system of HEI's perceived value and competitive advantage. As a practical contribution, this study provides the leaders or managers of HEIs with a better understanding of the perceived value of a new system being adopted. Accordingly, IT managers can take the necessary steps by enlightening the ERP platform for the implementation at the earlier stage. Also, ERP vendors can detect their clients' readiness and potential problems before implementing these systems. In terms of a theoretical contribution, this study is one of the first attempts that advance the knowledge of ERP perceived value principally at the firm level from RBT insight. The findings regarding the ERP perceived value and competitive advantage in a new context (higher education), new

user group (HEIs), and new cultural setting (Egypt), which is a critical step to advance a theory (Alvesson & Kärreman, 2007). Moreover, this study sheds light on the antecedents of ERP competitive advantage in the higher education setting through adopting RBT theory. Overall, this study advocated the adoption of ERP systems and mainly contributed to the knowledge in the area of IT adoption in Egypt as the perceived value of ERP systems by HEIs has not been investigated so far.

Future Directions

HEIs can effectively persevere in the ICT era by adopting an ERP system. The need to evaluate HEIs' benefits and outcomes from both the user's perspective and organization level is increasingly crucial. Employing ERP technology in the higher education sector is very critical to its competitiveness. That is due to successful ERP implementations can positively affect the quality of services to HEIs' stakeholders. Alternatively, the lack of conceptualized frameworks, empirical researches, and the critical demand for validated measures require more investigation in the form of further research examining the fit between ERP systems and their outputs among HEIs. This conclusion could potentially help HEIs and practitioners, including vendors, to find reasonable answers and explanations to the history of ERP failures.

Moreover, such an investigation will help HEIs, as practitioners and ERP professionals, shift their attention from success and failure factors only, to more important adoption factors such as TOE factors and technological readiness and shift their discussion to how these factors can increase the ERP potential benefits, especially in the ERP pre-implementation phase. Also, the lack of empirical research on ERP issues at the early stage is the main motive to explore the impacts of ERP adoption on HEIs' competitiveness. Furthermore, the sample of this study is inadequate, so a generalization of the findings may be limited, as well. In the future, this study can be further replicated using any probability sampling techniques to obtain a more representative sample of HEIs in Egypt. At the point of the investigation, most universities have not developed ERP systems yet. In the future, should ERP systems implemented across the majority of HEIs, it would be important to compare the findings at the pre-implementation and post-implementation stages. Also, the outcomes of this research are limited due to the geographical focus on Egyptian HEIs.

To conclude, this paper suggests that researchers move their concern from technical and end-user perspectives to organizational perspectives. Also, changing their focus from post-implementation and success factors to more important drivers of ERP adoption at the pre-implementation stage that creates value and outcomes. Lastly, future research is suggested to empirically investigate the impact of ERP systems on HEI's organizational performance and competitive advantages at the early stage.

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References

- Abdelghaffar, H. (2012). Success factors for ERP implementation in large organizations: the case of Egypt. *The Electronic Journal of Information Systems in Developing Countries*, 52(1), 1-13.
- Abdelghaffar, H., & Azim, R. H. A. (2010). *Significant factors influencing ERP implementation in large organizations: Evidence from Egypt*. Paper presented at the European, Mediterranean & Middle Eastern Conference on Information Systems (EMCIS).
- Abdellatif, H. J. (2014). *ERP in higher education: a deeper look on developing countries*. Paper presented at the The International Conference on Education Technologies and Computers (ICETC).
- Al-Jabri, I. M., & Roztock, N. (2015). Adoption of ERP systems: Does information transparency matter? *Telematics and Informatics*, 32(2), 300-310.
- Al Kilani, B., Adlouni, S., Al Ahbabi, S., & Al Yahyaie, Z. (2012). ERP Systems in Arab Education Sector: Towards Improved Implementation. *Information systems applications in the Arab education sector*, 63.
- Almahamid, S., & Awsi, O. (2015). Perceived Organizational ERP Benefits for SMEs: Middle Eastern Perspective. *Interdisciplinary Journal of Information, Knowledge & Management*, 10.
- Alvesson, M., & Kärreman, D. (2007). Constructing mystery: Empirical matters in theory development. *Academy of management review*, 32(4), 1265-1281.
- Amit, R., & Schoemaker, P. J. (1993). Strategic assets and organizational rent. *Strategic management journal*, 14(1), 33-46.
- Arpaci, I., Yardimci, Y. C., Ozkan, S., & Turetken, O. (2012). Organizational adoption of information technologies: A literature review. *International Journal of eBusiness and eGovernment Studies*, 4(2), 37-50.
- Badewi, A., Shehab, E., Zeng, J., & Mohamad, M. (2018). ERP benefits capability framework: orchestration theory perspective. *Business Process Management Journal*, 24(1), 266-294.
- Barney, J. B., & Clark, D. N. (2007). *Resource-based theory: Creating and sustaining competitive advantage*: Oxford University Press on Demand.
- Beard, J. W., & Sumner, M. (2004). Seeking strategic advantage in the post-net era: viewing ERP systems from the resource-based perspective. *The Journal of Strategic Information Systems*, 13(2), 129-150.
- Bernroider, E. W. (2008). IT governance for enterprise resource planning supported by the DeLone–McLean model of information systems success. *Information & Management*, 45(5), 257-269.

- Bett, K. A. (2018). Challenges and Prospects of Enterprise Resource Planning (ERP) Systems in the Newly Chartered Public Universities in Kenya. *International Journal of Scientific Research and Management*, 6(02).
- Bhat, J. M., Shroff, B., & Bandi, R. K. (2013). User perceptions, motivations and implications on ERP usage: An Indian Higher Education Context *Enterprise Information Systems of the Future* (pp. 90-105): Springer.
- Boonstra, A. (2013). How do top managers support strategic information system projects and why do they sometimes withhold this support? *International Journal of Project Management*, 31(4), 498-512.
- Bradford, M., & Florin, J. (2003). Examining the role of innovation diffusion factors on the implementation success of enterprise resource planning systems. *International journal of accounting information systems*, 4(3), 205-225.
- Catherine, C., & Abdurachman, E. (2018). ERP System Adoption Analysis Using TOE Framework in Permata Hijau Group (PHG) Medan. *International Journal of Enterprise Information Systems (IJEIS)*, 14(3), 91-105.
- Chang, I.-C., Hwang, H.-G., Hung, M.-C., Lin, M.-H., & Yen, D. C. (2007). Factors affecting the adoption of electronic signature: Executives' perspective of hospital information department. *Decision Support Systems*, 44(1), 350-359.
- Chen, S.-Y., & Lu, C.-C. (2016). Exploring the relationships of green perceived value, the diffusion of innovations, and the technology acceptance model of green transportation. *Transportation Journal*, 55(1), 51-77.
- Day, G. S. (1994). The capabilities of market-driven organizations. *The Journal of Marketing*, 37-52.
- Débrosse-Bruno, M. M. (2017). *Critical Success Factors (CSFs) for Implementation of Enterprise Resource Planning (ERP) Systems in Various Industries, Including Institutions of Higher Education (IHEs)*. University of Maryland University College.
- Dwivedi, Y. K., Papazafeiropoulo, A., Ramdani, B., Kawalek, P., & Lorenzo, O. (2009). Predicting SMEs' adoption of enterprise systems. *Journal of Enterprise information management*, 22(1/2), 10-24.
- El Sawah, S., Abd El Fattah Tharwat, A., & Hassan Rasmy, M. (2008). A quantitative model to predict the Egyptian ERP implementation success index. *Business Process Management Journal*, 14(3), 288-306.
- El Sayed, H. (2008). Management Control and ERP Systems: A Case Study from Egypt: University of Manchester.[On line]. Available at< www.schulich.ac.uk/mitev/activities>. Accessed on [12th of December, 2011].
- El Sayed, M., Hubbard, N. J., & Tipi, N. S. (2013). Evaluating enterprise resource planning (ERP) post implementation problems in Egypt: Findings from case studies of governmental, multinational and private Egyptian organizations.
- Elragal, A. A., & Al-Serafi, A. M. (2011). The effect of ERP system implementation on business performance: An exploratory case-study. *Communications of the IBIMA*, 670212, 1-19.
- Eutsler, J., & Lang, B. (2015). Rating scales in accounting research: The impact of scale points and labels. *Behavioral Research in Accounting*, 27(2), 35-51.

- Feldman, G., Shah, H., Chapman, C., Pärn, E. A., & Edwards, D. J. (2017). A systematic approach for enterprise systems upgrade decision-making: Outlining the decision processes. *Journal of Engineering, Design and Technology*, 15(6), 778-802.
- Fielding, J., Gilbert, N., & Gilbert, G. N. (2006). *Understanding social statistics*: Sage.
- Glenn Richey Jr, R., & Autry, C. W. (2009). Assessing interfirm collaboration/technology investment tradeoffs: the effects of technological readiness and organizational learning. *The International Journal of Logistics Management*, 20(1), 30-56.
- Haberli Jr, C., Oliveira, T., & Yanaze, M. (2017). Understanding the determinants of adoption of enterprise resource planning (ERP) technology within the agri-food context: the case of the Midwest of Brazil. *International Food and Agribusiness Management Review*, 20(5), 729-746.
- Haddara, M., & Elragal, A. (2013). ERP adoption cost factors identification and classification: a study in SMEs. *International Journal of Information Systems and Project Management*, 1(2), 5-21.
- Hair Jr, J. F., & Lukas, B. (2014). *Marketing research* (Vol. 2): McGraw-Hill Education Australia.
- Helo, P., Anussornnitisarn, P., & Phusavat, K. (2008). Expectation and reality in ERP implementation: consultant and solution provider perspective. *Industrial Management & Data Systems*, 108(8), 1045-1059.
- Hsu, C.-L., & Lin, J. C.-C. (2018). Exploring Factors Affecting the Adoption of Internet of Things Services. *Journal of Computer information systems*, 58(1), 49-57.
- Hung, S.-Y., Hung, W.-H., Tsai, C.-A., & Jiang, S.-C. (2010). Critical factors of hospital adoption on CRM system: Organizational and information system perspectives. *Decision Support Systems*, 48(4), 592-603.
- IDSC. (2017, 24 August 2017). The importance of supporting and empowering State institutions, especially academic and research. Retrieved from <http://gate.ahram.org.eg/News/1571285.aspx>
- Ifinedo, P. (2011). Examining the influences of external expertise and in-house computer/IT knowledge on ERP system success. *Journal of Systems and Software*, 84(12), 2065-2078.
- Kalling, T. (2003). ERP systems and the strategic management processes that lead to competitive advantage. *Information Resources Management Journal*, 16(4), 46.
- Karia, N. (2018). Knowledge resources, technology resources and competitive advantage of logistics service providers. *Knowledge Management Research & Practice*, 16(3), 414-426.
- Karia, N., & Asaari, M. (2016). Innovation capability: the impact of teleworking on sustainable competitive advantage. *International Journal of Technology, Policy and Management*, 16(2), 181-194.
- Karia, N., & Soliman, M. (2017). Factors affecting enterprise resource planning (ERP) systems adoption among higher education institutions in Egypt. *INTERNATIONAL JOURNAL OF ADVANCED AND APPLIED SCIENCES*, 4(5), 8. doi:10.21833/ijaas.2017.05.025
- Khalid, J., Ram, B. R., Soliman, M., Ali, A. J., Khaleel, M., & Islam, M. S. (2018). Promising digital university: a pivotal need for higher education transformation. *Int. J. Management in Education*, 12(3), 264-275.
- Kim, H.-W., & Kankanhalli, A. (2009). Investigating user resistance to information systems implementation: A status quo bias perspective. *MIS quarterly*, 567-582.

- Klöcker, P., Bernnat, R., & Veit, D. (2014). Implementation through force or measure? How institutional pressures shape national ehealth implementation programs.
- Kotler, P., Keller, K., Brady, M., Goodman, M., & Hansen, T. (2009). *Marketing Management* (Harlow: Pearson Education Limited). *Google Scholar*.
- Mathooko, F. M., & Ogutu, M. (2015). Porter's five competitive forces framework and other factors that influence the choice of response strategies adopted by public universities in Kenya. *International Journal of Educational Management*, 29(3), 334-354.
- Mohamed, L. M. (2015). Exploring the critical success factors (CSF) and limitations of enterprise resource planning (ERP) systems: The case of Egyptian hotels. *Journal of Hospitality Management and Tourism*, 6(3), 17-29.
- Nazemi, E., Tarokh, M. J., & Djavanshir, G. R. (2012). ERP: a literature survey. *The International Journal of Advanced Manufacturing Technology*, 61(9-12), 999-1018.
- Pan, M.-J., & Jang, W.-Y. (2008). Determinants of the adoption of enterprise resource planning within the technology-organization-environment framework: Taiwan's communications industry. *Journal of Computer information systems*, 48(3), 94-102.
- Panorama Consulting Solutions. (2018, December 30). Panorama's 2018 ERP Report. Retrieved from <https://www.panorama-consulting.com/resource-center/erp-software-research-and-reports/>
- Penrose, E. (1959). *The Theory of the Growth of the Firm*, New York: John Wiley and Sons: Inc.
- Porter, M. E. (1998). *Clusters and the new economics of competition* (Vol. 76): Harvard Business Review Boston.
- Puklavec, B., Oliveira, T., & Popovič, A. (2018). Understanding the determinants of business intelligence system adoption stages: An empirical study of SMEs. *Industrial Management & Data Systems*, 118(1), 236-261.
- Rabaa'i, A. A. (2009). Identifying critical success factors of ERP Systems at the higher education sector.
- Rabaa'i, A. A., Bandara, W., & Gable, G. (2009). *ERP systems in the higher education sector: a descriptive study*. Paper presented at the Proceedings of the 20th Australasian Conference on Information Systems.
- Ray, G., Barney, J. B., & Muhanna, W. A. (2004). Capabilities, business processes, and competitive advantage: choosing the dependent variable in empirical tests of the resource-based view. *Strategic management journal*, 25(1), 23-37.
- Richey, R., Tokman, M., & Skinner, L. (2008). Exploring technological readiness in retail-supplier partnerships: how technology utilization can impact retailer performance. *Journal of Business Research*, 61(8), 842-849.
- Ruivo, P., Oliveira, T., & Neto, M. (2014). Examine ERP post-implementation stages of use and value: Empirical evidence from Portuguese SMEs. *International journal of accounting information systems*, 15(2), 166-184.
- Ruivo, P., Rodrigues, J., Johansson, B., Oliveira, T., & Rebelo, J. (2016). Using TOE and RBV theories to define a theoretical model to assess ERP value across Iberian Manufacturing and Services SMEs. *Procedia Computer Science*, 100, 474-479.
- SCU. (2019). List of Egyptian HEIs. Retrieved from <http://www.scu.eun.eg/>

- Seo, G. (2013). *Challenges in implementing enterprise resource planning (ERP) system in large organizations: similarities and differences between corporate and university environment*. Massachusetts Institute of Technology.
- Seol, S., Lee, H., & Zo, H. (2016). Exploring factors affecting the adoption of mobile office in business: an integration of TPB with perceived value. *International Journal of Mobile Communications*, 14(1), 1-25.
- Shahawai, S. S., Hashim, K. F., & Idrus, R. (2014). *Enterprise resource planning adoption among Small Medium Enterprises (SME) in Malaysia*. Paper presented at the Knowledge Management International Conference (KMICe) 2014, Malaysia. <http://repo.uum.edu.my/14724/1/K37.pdf>
- Soliman, M., & Karia, N. (2015a). Enterprise Resource Planning (ERP) system as an Innovative Technology in Higher Education Context in Egypt. *International Journal of Computing Academic Research (IJCAR)*, 5(4), 265-269.
- Soliman, M., & Karia, N. (2015b). Higher Education Competitive Advantage: Enterprise Resource Planning Systems. *International Journal of Research in Management & Technology (IJRMT)*, 5(5), 380-384.
- Soliman, M., & Karia, N. (2016, March 8-10). *Enterprise Resource Planning (ERP) Systems in the Egyptian Higher Education Institutions: Benefits, Challenges and Issues*. Paper presented at the International Conference on Industrial Engineering and Operations Management, Kuala Lumpur, Malaysia. .
- Soliman, M., & Karia, N. (2017). Antecedents for the Success of the Adoption of Organisational ERP among Higher Education Institutions and Competitive Advantage in Egypt. *Engineering, Technology & Applied Science Research*, 7(3), 6.
- Soliman, M., Karia, N., Moeinzadeh, S., Fauzi, F. B. A., & Islam, M. S. (2017). *Towards an Understanding of the Behavior Intention and Benefits to Use Enterprise Resource Planning Systems among Higher Education Institutions' End-Users in Egypt: The Role of Readiness for Change*. Paper presented at the 12th Asian Academy of Management International Conference 2017, Penang, Malaysia.
- Soliman, M., Karia, N., Moeinzadeh, S., Islam, M. S., & Mahmud, I. (2019). Modelling Intention to Use ERP Systems among Higher Education Institutions in Egypt: UTAUT Perspective. *Int. J Sup. Chain. Mgt Vol*, 8(2), 429.
- Stratman, J. K. (2007). Realizing benefits from enterprise resource planning: does strategic focus matter? *Production and Operations Management*, 16(2), 203-216.
- Supramaniam, M., & Kuppusamy, M. (2010a). *ERP System Adoption in Malaysia: A Comparative Analysis Between SMEs and MNCs*. Paper presented at the European Conference on Information Management and Evaluation.
- Supramaniam, M., & Kuppusamy, M. (2010b). ERP system implementation: A Malaysian perspective. *Journal of Information Technology Management*, 21(1), 35-48.
- Tavakol, M., & Dennick, R. (2011). Making sense of Cronbach's alpha. *International journal of medical education*, 2, 53.
- Terminanto, A., & Hidayanto, A. N. (2017). *Identifying Characteristics and Configurations in Open Source ERP in Accounting Using ASAP: A Case Study on SME*. Paper presented at the

International Conference on Soft Computing, Intelligent System and Information Technology (ICSIT), 2017

- Tornatzky, L. G., Fleischer, M., & Chakrabarti, A. K. (1990). *The processes of technological innovation*: Lexington Books.
- Uwizeyemungu, S., & Raymond, L. (2012). Impact of an ERP system's capabilities upon the realization of its business value: a resource-based perspective. *Information technology and Management*, 13(2), 69-90.
- Wen, K.-W., & Chen, Y. (2010). E-business value creation in Small and Medium Enterprises: a US study using the TOE framework. *International Journal of Electronic Business*, 8(1), 80-100.
- Xu, J., & Quaddus, M. (2013). Using information systems for enhancing internal operation: enterprise resource planning systems *Managing Information Systems* (pp. 109-119): Springer.
- Xu, W., Ou, P., & Fan, W. (2017). Antecedents of ERP assimilation and its impact on ERP value: A TOE-based model and empirical test. *Information systems frontiers*, 19(1), 13-30.
- Zare Mehrjerdi, Y. (2010). Enterprise resource planning: risk and benefit analysis. *Business Strategy Series*, 11(5), 308-324.
- Zhu, Y., Li, Y., Wang, W., & Chen, J. (2010). What leads to post-implementation success of ERP? An empirical study of the Chinese retail industry. *International Journal of Information Management*, 30(3), 265-276.

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