

Erp Implementation Process Improvement: A Methodological Proposals

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Abstract

In today's business context, ERP systems are highly complex. Many firms find it challenging to modify their business procedures in order to improve their business system. The establishment of these systems requires a substantial amount of money and effort. A comprehensive negotiation of the transformation must address the present processes, the future processes, and the new requirements for process automation of the future processes, forecasting and developing these extra demands. The primary purpose of our study is to enhance the functionality of ERP system implementation in manufacturing enterprises and minimise the risk of information systems system failure. Existing theoretical techniques were analysed in order to design a more effective strategy for adopting ERP systems in businesses. Theoretical evaluations and practical research highlighted deficiencies using a questionnaire survey. The recommended ERP system implementation method for an industry sector should, in our view, resolve these concerns. Our objective is to concentrate on the most essential ERP system deployment components.

Keywords - ERP, enterprise resource planning, information system, ERP selection process, business process, business process evaluation.

I. INTRODUCTION

Enterprise resource planning systems, also known as ERP, are a kind of corporate information system that is historically difficult to understand. The deployment of these systems takes a significant investment of time, money, and other resources on the part of the business [1]. At the moment, information has become one of the variables of manufacturers, therefore the

enterprise's information system is a critical aspect in business competitiveness [2]. As is well known, enterprise resource planning information solutions aid in the automation and integration of an organization's core activities.

The fourth and last major component of an information system is the process. To achieve a goal, tasks are executed in a sequential manner. A business process, on the other hand, is one that

aims to accomplish a business objective. At some point in our lives, we have all participated in a business process. In order to achieve their aims, businesses must through a variety of procedures.

The more efficient a corporation is, the better its procedures. Some businesses see their procedures as a way to achieve a competitive edge. A method that accomplishes its objective in an unusual manner may set a specific distinct from its rivals. If a business executes a strategy for reducing expenses, it may be able to reduce its costs or keep a larger portion of its revenues. Each of us does several tasks during the course of the day without giving them a second thought, such as getting ready for work, using an ATM, and checking e-mail. When procedures get more complicated, they must be recorded. In order for enterprises to maintain control over how operations are carried out inside their company, this is an absolute need [3].

Maintaining a record of an organization's procedures is becoming more of an administrative burden. As processes evolve and improve, it's critical to keep track of the most current versions. Maintaining a procedure that is easy to update is also critical. In part, the need to handle process documentation prompted the development of a document management solution. The following features are provided by a document management system: storage, tracking, and analysis.

ERP can manage a company's resources and operations on a global scale. The fact that the system is driven by a software programme indicates that it was developed with a certain protocol and set of guidelines in mind from the beginning. It must be installed and configured specifically for a certain business in order for it to be successful [4]. When using an ERP system, each and every piece of information is filed away in a solitary and centralised database.

Because the organization's systems are now centralised, data that is recorded in one department of the company may be readily accessible and used in other departments of the company. That's capable of handling the operations of an entire company: It is feasible to

use an ERP in order to monitor all of the processes that are taking place inside a business. Manufacturing and sales modules are two examples of the types of modules that may be acquired as part of an ERP system. Other modules may represent other types of business processes.

When it comes to the number of modules that they should purchase, every business has its own set of priorities. In addition to centralising data, ERP systems enforce procedures that are adopted by an organisation. The rules for the linked business processes must be implemented when an ERP provider creates a module. The fact that an ERP system is pre-loaded with best practises is one of its main selling points. Meaning that a company's enhanced best practises are also part of the bargain when it deploys an ERP.

A significant issue with the ERP installation process is that relatively few threats and risks of failures are described in the literature, maybe because few organisations want to disclose their implementation problems [5].

This article focuses on ERP systems in medium and large enterprises. Based on the findings of the exploratory study, we also give the best implementation method. ERP adoption is examined in terms of the most important variables in an actual and research study [6]. As stated in the provided research article, our major goal is to boost the efficacy of ERP system installation in industrial organisations and decrease the risks involved with ERP system implementation failure.

II. LITERATURE REVIEW

ERP systems have been widely used since the mid-1990s, when many of organisations throughout the world adopted technology. To enable cross-functional processes, these corporation online interactive solutions make use of a central database. ERP systems, as far as we know, are designed to provide real-time, up-to-date data and improved workflow across functional areas, with more consistency across varied business operations [7].

Presently, understanding of information systems is required for developing profitable,

competitive businesses, managing multinational organisations, increasing corporate value, and offering relevant goods and services to clients [8]. The influence of information and technology on the productivity of both industrial and service firms is enormous [9]. Balanced Scorecard, Lean Manufacturing, and other methodological principles are used by company management for integrated Business Performance Management [10]. Although the Balanced Scorecard may be successfully implemented without the backing of a high-quality corporate information system, this idea will not work if it is not functioning with vast volumes of data and information [11]. There are a variety of methods available, such as lean manufacturing, collaborative work environments, information management, and e-commerce, to name just a few [12].

Planning systems for businesses' resources seem to be a wonderful experience. Common software solutions offer smooth connectivity of all data flows in the organization, including financial and accounting information as well as human resource and procurement data [13]. Inconsistent information systems and uneven operational methods have long been a source of aggravation and cost for management. The prospect of a "off-the-shelf" solution to the challenge of business integration seems appealing [14]. Many experts point out that ERP is an essential component for improving competitiveness, simplifying operations, and using "lean" manufacturing practises in the production process [15]. In support of their claim, they cite tens of thousands of organisations throughout the globe that have or are preparing to deploy ERP systems [16].

However, the choice of ERP system is an important and fundamental factor for enterprise level stakeholders in organisations striving to maintain being competitive as it is a significant investment decision. It is essential to choose an ERP system that satisfies these criteria in order to have a successful ERP installation due to the difficulty of change management, the high costs of implementation, and the requirement for alignment with the organization's goals and

objectives. All of these factors contribute to the complexity of ERP installations.

The most essential component of the process is the adoption of an ERP system, and the selection procedure should be suited to the organization's specific needs and based on criteria. In addition, the selection approach should be based on criteria. The most significant things to think about are the product's functionality, its technology and expertise, its flexibility and application scalability, its pricing, execution, and user-friendliness [17].

To address the needs of multiple functional areas, ERP system planning and deployment need an integrated strategy. New information systems aren't always beneficial to a business. When it comes to system installation, numerous elements come into consideration [18]. Businesses that want to become more integrated face risks when implementing ERP because of the new technology's complexities that grow over time and therefore can be recognized in full when choices need to be made [16]. In the early stages of ERP research, articles and case studies in the business media and practitioner-focused publications are the primary sources of information. Subjective material based on a few achievements or failures is prominent in many of these topics [19].

Many ERP implementations have failed, partly because few organisations want to make their implementation problems public, and this has created a significant challenge for the ERP installation process as a whole [20]. ERP implementations are fraught with both external and domestic vulnerabilities. Outside of the organization's control, external risk factors relate to an uncertain environment, and include technical risks like those associated with hardware and software, as well as financial risks like those associated with telecommunications costs, system reconfiguration expenses, and specification change risks. Unpredictable user resistance, commitment escalation risk, employee turnover costs, maintenance expenses, and the management's ability to properly deploy ERP are all examples of domestic risks that might occur inside a company [21].

In order to assess the likelihood of ERP deployment success, we must consider the risks associated with it on an organisational level [22]. Because implementing such a system will require a significant outlay of money and resources, it's critical to weigh the risks and come up with a plan to mitigate them as much as possible during the implementation phase [23].

According to the research that has been done, there are three key social enablers that must be present in order for an enterprise resource planning (ERP) implementation to be successful. These enablers are committed and competent leadership, good communication, and an aligned and empowered implementation team. Very few surveys have attempted to investigate the role of these human factors empirically and thoroughly [24].

The company is a representation of an open, dynamic, and objective-driven system that is in constant interaction with both its internal and

external environments [25]. Enterprises' overall efficiency and competitiveness can be adversely affected by a constantly changing environment. In order for a company to maintain its competitiveness and performance, it must be able to work effectively and timely with information, not only from the historical context, but also from the long term. Users can improve their company's productivity and efficiency by using an ERP system.

Today's business managers are constantly searching for new and useful information, especially regarding the company's continued expansion. ERP systems of the II. Development type are currently the ones responsible for performing this task [26]. Figure 1 depicted the data utilised in business intelligence (BI), which has become their principal role to plan and simulate a number of probable outcomes for the enterprise's long-term development.

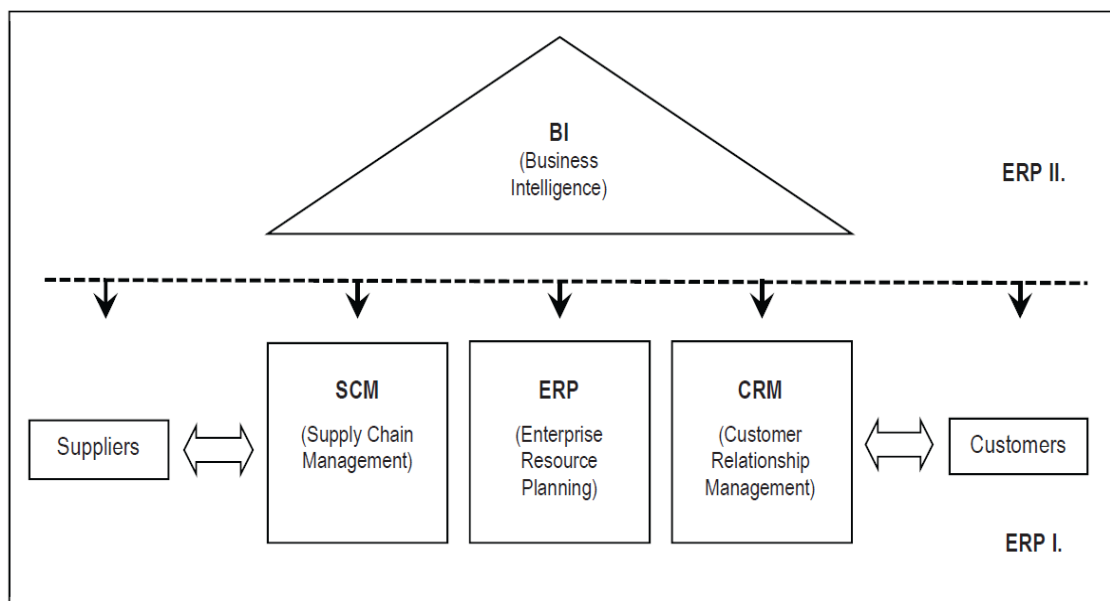


Figure 1: ERP II. Advance Business Intelligence System

III. METHODOLOGY

As previously stated, the primary goal of our study was to look into ways to improve the efficiency with which ERP system deployments are carried out in middle and large industries, as well as to identify ways to reduce the risks associated with ERP system implementations that go incorrectly.

By carrying out theoretical research on the competitiveness of industrial companies as well as on existing ERP systems, we hope to develop a better understanding of the functionality and competency of these systems according to the size of the company they serve. The market for ERP systems was analysed to determine whether or not these kinds of programmes are easily accessible and utilised by companies of varying

sizes. In order to develop a methodology for the implementation of ERP systems in industrial organisations, it was necessary to investigate the process of putting ERP software into action in a number of industrial organisations that ranged in size from middle to large. Additionally, the theoretical concepts relating to the implementation of ERP software based on standardised procedures were investigated [27]. The research led to the discovery of the inconsistencies in the plan.

These problems can be overcome by using the method that is advised for integrating ERP systems inside the organisation. The subsequent part of our research investigation will focus on the implementation of ERP systems in medium and large industrial companies. In order to put the strategy into action, we will need to complete a pre-project phase as well as six different project phases [28]. The content of each phase specifies the actions that must be completed so that the implementation process does not fail [29]. The requirements for the information that a corporation needs to have are figured out during the pre-project phase. Both the ability of the ERP system installation to find a healthy balance between time and money [30], as well as the effect that human factors have on the adoption process and its outcomes, are under ongoing evaluation.

IV. FINDINGS

The adoption of ERP in firms with moderate and big sizes usually takes many years, and the whole process involves a variety of resources, including intellectual, fiscal, and materials elements. When establishing ERP systems in businesses, it is recommended to utilise a strategy based on project management because of this reason. According to the findings of our investigation, we are able to condense the particulars of ERP implementation projects into the following points: Uniqueness, complexity, the human aspect, corporate nature of the project, change in organizational culture, employees' risk avoidance, lack of knowledge, and low experience are some of the challenges that may be encountered.

ERP system deployment was seen as a major shift by 88.3% percent of surveyed organisations as having a significant impact on the company's current and particularly future performance. The relevance of the new ERP system deployment was evaluated by 94.7% percent of the managers who were also aware of the company's repercussions of ERP system adoption. They notice the changes by gaining a new tool for standard users, as well as the new options and possibilities that an ERP system delivers. The introduction of the new ERP system was seen favourably (100%) by IT employees, who were also able to understand the importance of the changes, utilization of new technology, but also challenges with ERP system stability in a professional IT context. The relevance of the modification was judged by key users at 81.4% percent, which is a strong indicator for management that future users comprehend the relevance of this change. This is also required for users to take a responsible attitude to these developments.

The following findings have been drawn on the basis of the information obtained from a questionnaire survey that was carried out at a number of organizations that ranged in size from medium to large:

- i. The implementation of an ERP system raises a corporation's productivity and competitiveness and lends vitality to the process of corporate growth.
- ii. All parties involved are aware of the changes that will be brought about by the implementation of the new ERP system, which will constitute a considerable improvement for the organisation.
- iii. The implementation approach is a significant aspect that performs a role in determining the overall effectiveness of the ERP system deployment.
- iv. The ability to analyze business processes and compile a list of needs for an ERP system that is being deployed is available to companies.
- v. Organizations are able to recognise and quantify the advantages that the established ERP system has brought them.

- vi. It is very crucial for corporate leaders and workers to feel that it is feasible to discover a means to quantify the return on investment into ERP system. Finding a way to measure the ROI into ERP system is vital.

During the introduction of an ERP system, dealing effectively with changes and uncertainty may be accomplished via the use of risk management, which also has a substantial impact on the accomplishment of the project. There has been an examination of the risks involved in the installation of ERP systems in relation to the various stages of the project life cycle. The assessments were conducted on records pertaining to previous ERP installation projects with the purpose of identifying the most prevalent hazards in terms of the chance of them

occurring and the possible effects they may have. The figure that follows provides a description of the most typical hazards associated with ERP installation projects in industrial firms. These risks need to be managed by certain stages of the project's life cycle, including designing, development, administration, and maintenance (Figure 2).

It is recommended that the risk management be managed by a responsible individual who would hold the role of Manager for risk management. Together with members of the sub-implementation teams, the external project manager, who was appointed by the provider, and the internal project manager, who was selected by the implementing organisation, are responsible for identifying the risks associated with the project.

Project Phases	Project Risks
System Designing	<ul style="list-style-type: none"> - The workload is quite demanding. - The provider significantly overestimated the system's level of relevance. - Significant percentage of employee turnover across the implementation team - The implementer oversees the vendors in an ineffective manner. - There have been an excessive number of changes made to the controls and procedures. - A potential modification to the law in the future may have an impact on the system's design and development. - The implementer either does not do adequate testing or does not conduct any testing at all. - The implementer does not have sufficient control over the system setup. - Inadequate level of specificity in the project specifications - Poor quality of the final product's documentation - The technology architecture does not correspond to the nature of the interactions nor even the existing load. - Poor interoperability with other systems
System Implementation	<ul style="list-style-type: none"> - Priority conflicts that are causing delays in the process - The difficulty of the degree data translation has been grossly overestimated. - The difficulty of the interfaces has been significantly underestimated. - The amount of funding necessary for execution has not been taken into consideration. - Lack of professional training on the recently implemented ERP system

	<ul style="list-style-type: none"> - There have been an excessive number of changes made to the controls and procedures. - Pushback from stakeholders and users, who believe that the ERP system does not adequately address their requirements or did not participate enough in the system's design and development. - Both the performance and the capacity of the system are not enough for the present activities.
Operation & Maintenance	<ul style="list-style-type: none"> - Failure to get sufficient funding to make necessary repairs to operations and technology - Due to a lack of suitable funding, there was not enough support for legislative changes and user demands. - Due to an inability to get sufficient funding for the project - Inadequate participation of key personnel in management - There is no ERP strategy in place. - Improper documentation and processes - Inadequate knowledge transfer from the provider to the staff responsible for maintenance and operations. - A breach in compliance with the project's processes and controls - Challenges encountered throughout the process of moving from the development phase to the operational phase

V. CONCLUSION

Because of the rapid rate at which technology is progressing, original equipment manufacturers (OEMs) all over the world are increasing their commitment to manufacturing excellence to maintain their competitive edge. To accomplish these corporate objectives and ambitions, business processes are becoming more interconnected with one another and more complicated, which necessarily makes new ERP installations more difficult and demanding than they have ever been.

This presents organization management with a multitude of threats and challenges in terms of selecting appropriate ERP tools and vendors to match the available infrastructure as well as the skill and expertise level of the organization. Additionally, it thus provides organization management with challenges in terms of selecting appropriate implementation methodologies and models, which will ultimately result in higher operational efficiencies and effectiveness of the organization, which will help it to remain competitive.

The primary goals of our research are to enhance the efficiency through which ERP systems are implemented in manufacturing organisations and to decrease the risks that are connected with the adoption of ERP systems not being successful. In order to develop an appropriate methodology for the installation of ERP systems inside industrial organisations, it was necessary to conduct research on the various theoretical approaches to ERP system implementation. On the basis of the theoretical analyses and the practical study carried out by means of a questionnaire survey, the deficiencies were determined.

The most significant hazards were established on the basis of the information obtained from a questionnaire survey which was carried out in a selection of organisations which ranged in size from medium to big. The various stages of the project life cycle have been taken into consideration while analysing the risks associated with ERP systems installation projects. Changes and unpredictability that arise during the deployment of an ERP system may be effectively managed using risk mitigation, which

also has a substantial impact on the overall success of the project.

REFERENCES

- Umble, E. J., Haft, R. R., & Umble, M. M. (2003). Enterprise resource planning: Implementation procedures and critical success factors. *European journal of operational research*, 146(2), 241-257.
- Frankovský, M., Stefko, R., & Baumgartner, F. (2006). Behavioral-situational approach to examining social intelligence. *Studia psychologica*, 48(3), 251.
- Hakim, A., & Hakim, H. (2010). A practical model on controlling the ERP implementation risks. *Information systems*, 35(2), 204-214.
- Mabert, V. A., Soni, A., & Venkataramanan, M. A. (2003). Enterprise resource planning: Managing the implementation process. *European journal of operational research*, 146(2), 302-314.
- Laudon, K., & Laudon, J. (2007). *Management Information Systems: Managing the Digital Firm*. (9th ed.). New Jersey: Pearson Prentice Hall, Pearson Education, (Chapter 1).
- Mandal, P., & Gunasekaran, A. (2003). Issues in implementing ERP: A case study. *European Journal of Operational Research*, 146(2), 274-283.
- Knápková, A., Pavelková, D., & Jirčíková, E. (2010). Possibilities for the utilization of concepts BSC and EVA for measuring and managing performance with the support of benchmarking. *Knowledge Management and Innovation: A Business Competitive Edge Perspective*, Vols 1-3.
- Pivnicka, M. (2011, September). The balanced scorecard and its practical applications in oracle balanced scorecard. In *The European Conference on Information Systems Management* (p. 540). Academic Conferences International Limited.
- Chromjaková, F. (2007). Parametrisation of intangible assets in the project management processes. In *Business Process Management and Controlling—Trends and Challenges*, INFER Conference on Process Management and Controlling.
- Tuček, D., Tučková, Z., & Zámečník, R. (2009). Business process management with software support. *Knowledge Management and Innovation in Advancing Economies—Analyses & Solutions*, Vols 1-3.
- Umble, E. J., Haft, R. R., & Umble, M. M. (2003). Enterprise resource planning: Implementation procedures and critical success factors. *European journal of operational research*, 146(2), 241-257.
- Aláč, P., Demoč, V., & Barčík, Š. (2010). Implementation and analysis of information system in a wood processing company. *Drvna industrija*, 61(2), 119-127.
- Mabert, V. A., Soni, A., & Venkataramanan, M. A. (2003). Enterprise resource planning: Managing the implementation process. *European journal of operational research*, 146(2), 302-314.
- Radut, C., & Codreanu, D. E. (2012). SELECTION OF AN ORGANIZATION SPECIFIC ERP. *Anale. Seria Stiinte Economice*. Timisoara, 18(suppl.), 384.
- Ferencíková, D. (2011, September). Information Systems for Production Planning and Scheduling and Their Impact on Business Performance. In *The European Conference on Information Systems Management* (p. 503). Academic Conferences International Limited.
- Wu, L. C., Ong, C. S., & Hsu, Y. W. (2008). Active ERP implementation management: A Real Options perspective. *Journal of Systems and Software*, 81(6), 1039-1050.
- Bobák, R. (2003). The Logistical Support of Competitive Enterprise Processes in Czech Industrial Manufacturers. In *Research Into the Competitive Abilities of Czech Industrial Producers—Workshop Proceedings* (pp. 14-22).
- Sarker, S., & Lee, A. S. (2003). Using a case study to test the role of three key social enablers in ERP implementation.

- Information & Management, 40(8), 813-829.
19. Oblak, L., Lipušček, I., Jelačić, D., & Motik, D. (2004). Model of integral decision-making in a wood industry company. *Drvna Industrija-Scientific and professional journal of wood technology*, 55(1), 13-18.
 20. Basl, J., & Blažíček, R. (2008). *Podnikové informační systémy*. (2nd ed.). Praha: Grada, (Chapter 4).
 21. Partono Prasetio, A., Duc Tai, T., Jade Catalan Oplencia, M., Abbas, M., A. Baker El-Ebiary, Y., Fadhil Abbas, S., Bykanova, O., Samal, A., & Iswanto, A. (2022). Impact of the COVID-19 pandemic on religious tourism amongst Muslims in Iraq. *HTS Teologiese Studies / Theological Studies*, 78(4), 6 pages. doi:<https://doi.org/10.4102/hts.v78i4.7565>
 22. Yousef A.Baker El-Ebiary, Samer Bamansoor, Waheeb Abu-Ulbeh, Wan Mohd Amir, Syarilla Iryani A. Saany, M. Hafiz Yusoff. "Using Interval Manager Mobile Application in Saving Time and Cost" Vol. 68, Editor's Issues, Oct. 2020, pp. 82-85, IJETT, Doi: 10.14445/22315381/CATI1P214. Scopus, ISSN: 2231-5381
 23. Yousef A.Baker El-Ebiary, Samer Bamansoor, Waheeb Abu-Ulbeh, Wan Mohd Amir, Syarilla Iryani A. Saany, M. Hafiz Yusoff. "A Prognosis of Chinese E-Governance" Vol. 68, Editor's Issues, Oct. 2020, pp. 86-89, IJETT, doi: 10.14445/22315381/CATI1P215. Scopus, ISSN: 2231-5381
 24. Yousef A.Baker El-Ebiary, Waheeb Abu-Ulbeh, Najeeb Abbas Al-Sammarraie, M. Hafiz Yusoff, W. M. Amir Fazamin W. Hamzah, Syarilla Iryani A. Saany. "The Role of ICT in Special Educational Needs – A Case Study of Malaysia" Vol. 68, Editor's Issues, Oct. 2020, pp. 90-93, IJETT, doi: 10.14445/22315381/CATI1P216. Scopus, ISSN: 2231-5381
 25. W. M. Amir Fazamin W. Hamzah, Waheeb Abu-Ulbeh, Najeeb Abbas Al-Sammarraie, Yousef A.Baker El-Ebiary, M. Hafiz Yusoff, Syarilla Iryani A. Saany, Azliza Yacob. "The Integration of Learning Management Systems with PLE – a Review Paper" Vol. 68, Editor's Issues, Oct. 2020, pp. 94-96, IJETT, doi: 10.14445/22315381/CATI1P217. Scopus, ISSN: 2231-5381
 26. Syarilla Iryani A. Saany, Waheeb Abu-Ulbeh, Najeeb Abbas Al-Sammarraie, Yousef A.Baker El-Ebiary, M. Hafiz Yusoff, W. M. Amir Fazamin W. Hamzah, Yanty Faradillah. "A New E-Learning Technique Using Mobility Environment" Vol. 68, Editor's Issues, Oct. 2020, pp. 97-100, IJETT, doi: 10.14445/22315381/CATI1P218. Scopus, ISSN: 2231-5381
 27. Aledinat Lowai Saleh, Syed Abdullah Fadzli, Yousef El-Ebiary. "Arabic Language Documents' Similarity and its Challenges (A Review)" Vol. 68, Editor's Issues, Oct. 2020, pp. 88-96, IJETT, doi: 10.14445/22315381/CATI2P214. Scopus, ISSN: 2231-5381
 28. Belal Alifan, Mokhairi Makhtar, Yousef El-Ebiary. "Propose Model for Consumers' Perceptions and Acceptance of e-Health Systems and Services in Jordan" Vol. 68, Editor's Issues, Oct. 2020, pp. 1-10, IJETT, doi: 10.14445/22315381/CATI3P201. Scopus, ISSN: 2231-5381
 29. Hazem M Bani Abdoh, Syarilla Iryani A. Saany, Hamid H. Jebur, Yousef El-Ebiary. "The Effect of PESTLE Factors on E-Government Adoption in Jordan: A Conceptual Model" Vol. 68, Editor's Issues, Oct. 2020, pp. 19-23, IJETT, doi: 10.14445/22315381/CATI3P203. Scopus, ISSN: 2231-5381
 30. Y. A. B. El-Ebiary, N. A. Al-Sammarraie, Y. Al Moaiad and M. M. S. Alzubi, "The impact of Management Information System in educational organizations processes," 2016 IEEE Conference on e-Learning, e-Management and e-Services (IC3e), 2016, pp. 166-169, doi: 10.1109/IC3e.2016.8009060.