Application Extent of the Enterprise Resource Planning Systems (ERP) Main Components in the Jordanian Industrial Public Firms

Firas Naim Dahmash[1*], Majed Abdel Majid Qabajeh[2], Nidal Mahmoud Al Ramahi [3], Khalil Mahmoud Al Refaee[4]

1. Accounting Department, the World Islamic Sciences & Education University, Amman, Jordan

2. Accounting Department, Applied Sciences Private University, Amman, Jordan

3. Accounting Department, Al-Zarqa Private University, Amman, Jordan

4. Accounting Department, Al-Balqa Applied University, Amman, Jordan

* E-mail of the corresponding author: firas_dahmash@hotmail.com

Abstract
This study aims to measure the application extent of a four main components of the Enterprise Resource Planning Systems (ERP) in the Jordanian public industrial firms which are Sales & Marketing, Management & Production, Accounting & Finance, and Human Resources, and to classify the application extent in these firms to low, medium and high. The study was applied on a sample of 82 firms. The results indicated that there is a medium application extent for the four components of Sales & Marketing, Management & Production, Accounting & Finance, and Human Resources, and the level of application was close for these four components
Keywords: Enterprise Resource Planning Systems (ERP), Application extent, Industrial firms, Jordan.

1. Introduction

Enterprise Resource Planning Systems (ERP) is distinct, and it is a programming designed to create integration between business activities through the integration of kinds of separated functions. Enterprise Resource Planning Systems (ERP) environment differ from the traditional systems environment, where the enterprise's operations are connected with each other through work processing computerized and relational databases which facilitate direct procession and limiting of economic events. Many firms increasingly moved towards purchasing software packages throughout the 1990s. Enterprise Resource Planning Systems (ERP) is comprehensive, and a fully integrated software packages that provide automated support for most of the standard business processes within firms. A firm's investment in Enterprise Resource Planning Systems (ERP) is typically measured in millions of dollars and the total market for ERP systems is forecast to be over $70 billion dollars by 2002. (Holland & Gibson, 1999).

The research literature of ERP systems has exponentially grown in recent years and many international studies discussed different aspects of the Enterprise Resource Planning Systems (ERP) area. As for the Jordanian context, we also find some studies which have been tested some aspects related to the Enterprise Resource Planning Systems (ERP) area. For example (Abdullah and Qatanani, 2007; Al-Zoubi, 2011; Al-Kasawna, 2012**)** tested the efficiency and effectiveness of the firm's accounting information systems for a number of Jordanian firms. Another studies for (Naash & Khamis 2009) tested the impact of using the accounting information systems on financial performance. However, there is no previous Jordanian study attempted to investigate and measure application extent of the applicable parts (components) of the Enterprise Resources Planning Systems (ERP) separately like Sales & Marketing, Management & Production, Accounting & Finance, and Human Resources in the Jordanian industrial public firms. According to that, this study came as a continue to the previous Jordanian studies in this area which will attempt to investigate and measure the application extent of the applicable parts (components) of the Enterprise Resources Planning Systems (ERP) separately which are: 1- Sales & Marketing, 2- Management
& Production, 3-Accounting & Finance, and 4- Human Resources in the Jordanian industrial public firms listed at Amman Security Exchange, and to classify these tested industrial firms into three levels (high, medium, and low) according to their extent of application for the Enterprise Resource Planning Systems (ERP).

2. Background

Firms, whether they are large or small, depend on information technology in administrating their processes. While works grow and develop, corporations work to develop information technology system in order to constantly handle their needs. Recently, new integrated systems were developed which is the Enterprise Resource Planning Systems (ERP). This is a packaging programming designed for client server environment, whether this environment is traditional or depending on the web. It is characterized by providing integrated results to the departments of the firm and assists these departments to increase the quality of their decisions and to prepare comprehensive integrated plans. (Brehm & Gomez, 2010). Enterprise Resource Planning Systems (ERP) is large programming packages enable the

work activities from integrating types of separated functions. Enterprise Resource Planning Systems (ERP) links relevant work processes one by one through computerizing work flow and relational databases which facilitate to restrict and manipulate economic events. A comprehensive definition adopted from Klaus, Rosemann, and Gable (2000: 141), is used in this study, where ERP systems are perceived as *"comprehensive packaged software solutions seek to integrate the complete range of a business's processes and functions in order to present a holistic view of the business from a single information and IT architecture".* They can link different areas of an organization, such as manufacturing, order management, financial systems, human resources, suppliers and customers, into a tightly integrated system with shared data and visibility (Chen, 2001). The process of new Enterprise Resource Planning Systems (ERP) application in organizations is a complex issue, while it is welcomed as a way to make employees more sufficiency and competence. Research in this area mostly includes topics such as application procedures, effective succession elements, risks and complications in applications of Enterprise Resource Planning Systems (ERP), and the successful strategies to effective applications for these systems. The Enterprise Resource Planning Systems (ERP) is taken originally from Manufacturing Resource Planning Systems (MRP), where Manufacturing Resource Planning Systems (MRP) developed when their tracks became basic part from programs structure and planning for enterprise when planning for corporation became as a part of standardized software activity.

3. Review of the literature

There are many previous studies tested different aspects of the Enterprise Resource Planning Systems (ERP), and the following are more related to our study topic.

(Al-Khasawna, 2012) evaluated the effectiveness of electronic accounting information systems in the Jordanian electricity firms under conditions of uncertainty through studying and assessing the availability of properties related to the quality of accounting information systems, and the ability of accounting information system to provide appropriate information for planning, control and decision-making under conditions of uncertainty. The finding indicated that the characteristics of electronic accounting information systems highly influence the performance of electricity companies of Jordan under conditions of uncertainty, and these systems is effective in providing information for the purposes of planning under conditions of uncertainty, and in providing information for decision-making under conditions of uncertainty. A recent Jordanian study by (Al-Zoubi, 2011) tested the effectiveness of the accounting information system for companies that adopting Enterprise Resource Planning Systems (ERP) that located in Al-Hassan Industrial Zone, and its relationship with the quality of accounting outputs (information) and the internal control. His finding indicated that there is an integration of accounting information system within the ERP system improving the quality of accounting outputs and the internal control in these companies.

A Greek study by (Galani, et al., 2010) investigated users' satisfactions concerning the effect of the Enterprise Resource Planning Systems (ERP) on the accounting information system and the practices of the accounting administrative for a sample of Greek companies. The results indicated that the Enterprise Resource Planning Systems (ERP) increased level of satisfaction for users of the accounting information system, system performance, system quality, reduce the costs, and improve the overall performance of the firms. Another Jordanian study by (Naash & Khamis, 2009) tested the impact of accountants in developing accounting information systems on those systems efficiency and application on financial performance, and to investigate the effect of the application of those systems on the financial performance for the Jordanian industrial firms. The findings indicated that there is a significance statistical relationship between participating accountants at all stages of the accounting information systems and the performance of those systems, and there are significance statistical differences between performance indicators before and after the application of the system except for sales operating income. The results also shows that there are statistically significant differences between the financial performance indicators of companies that apply the computer-based accounting information systems and those companies financial indicators that do not apply such systems. Also, another Jordanian study by (Abdullah and Qatanani, 2007) tested the characteristics, variables, and factors that make up the banking environment and to measure its impact on the efficiency and effectiveness of accounting information systems in Jordanian commercial banks. The study showed that there is a great influence for each legal factors, professional regulations, technical factors, administrative and organizational factors, and behavioral factors on the efficiency and effectiveness of accounting information systems. Also, the efficiency and effectiveness of these systems vary depending on the different level of the banking management interest of these factors at building, designing and developing accounting information systems. Finally, (Spathis & Constantinides, 2004) investigated the effect of improvements offered by the ERP system to the accounting information system, and to identify the ways to develop ERP system in the future. The study was applied on 26 Greek firms by using a questionnaire. The findings showed that the ERP system

improves effectiveness of internal control, quality, reliability and motivated management towards better performance.

4. Methodology

4.1 Research Hypothesis

Based on the previous studies, it's noted that there is an existence and usage for the Enterprise Resource Planning Systems (ERP) in the Jordanian firms in general. However, there is no clear information about the nature of these systems, application extent, main components, and classifications of its application extent. According to that, this study will attempt to investigate and measure the application extent of the applicable parts (components) of the Enterprise Resources Planning Systems (ERP) separately (one by one) which are: 1- Sales & Marketing, 2- Management & Production, 3- Accounting & Finance, and 4- Human Resources in the Jordanian industrial public firms. In addition to that, this study will classify the tested industrial firms into three levels (high, medium, and low) according to their application extent of the Enterprise Resource Planning Systems (ERP) in these firms. According to that, we can formulate the following main hypothesis as follows:

HA(1): There is an application extent for the four applicable parts (components) of the Enterprise Resource Planning Systems (ERP) which are: 1- Sales & Marketing, 2- Management & Production, 3- Accounting & Finance, and 4- Human Resources in the Jordanian public industrial firms.

Based on this primary hypothesis, we can derive from it another four sub hypotheses as follows:

Ha$_{1.1}$: There is an application extent for the Sales and Marketing Systems as a part of the four applicable parts (components) of the Enterprise Resource Planning Systems (ERP) in the Jordanian public industrial firms.
Ha$_{1.2}$: There is an application extent for the Production and Management Systems as a part of the four applicable parts (components) of the Enterprise Resource Planning Systems (ERP) in the Jordanian public industrial firms.

Ha$_{1.3}$: There is an application extent for the Finance and Accounting Systems as a part of the four applicable parts (components) of the Enterprise Resource Planning Systems (ERP) in the Jordanian public industrial firms.
Ha$_{1.4}$: There is an application extent for the Human Resources Systems as a part of the four applicable parts (components) of the Enterprise Resource Planning Systems (ERP) in the Jordanian public industrial firms.

4.2 Data collection method, population and sample

We developed an integrated questionnaire to be our primary tool for collecting the required data for this study. The developed paragraphs (questions) and parts of the questionnaire have been developed to cover all the detailed variables of: Sales & Marketing, Management & Production, Accounting & Finance, and Human Resources. The questionnaire has been designed of two parts. The first part consists of group of general questions related to the respondent's himself like qualification, specialization and experiences. The second part (technical part) of this questionnaire consists of a number of questions, which is formed in its total the four' parts (components) of all the detailed variables of: Sales & Marketing, Management & Production, Accounting & Finance, and Human Resources. The questions were designed and organized to be clear and integrated as much as possible to guarantee a high acceptance level of understanding for every question by the respondents. We used the well known five degrees (Likert Interval Scale) from number one to number five. Number one represent the very low degree of application to number five which representing the very high degree of application for the systems. Every number (group) of questions in the questionnaire represents one of the previous mentioned four sub-systems (components) of the total Enterprise Resource Planning Systems (ERP). The following Table (1) illustrated the number of questions in the questionnaire for each part (component).

Table (1) Number of questions for every (part) component

Number of questions for each (part) component	Component name
1-8	Sales & Marketing
9-20	Management & Production
21-32	Accounting & Finance
33-42	Human Resources
42	Total number of questions

The tested industrial firms were classified according to their application extent of the mentioned four components of the Enterprise Resource Planning Systems as follows: A high application extent of the four components of the Enterprise Resource Planning Systems (ERP), a medium application extent of the four components of the Enterprise Resource Planning Systems (ERP), and a low application extent of the four components of the Enterprise Resource Planning Systems (ERP).

The population of this study represented all the Jordanian listed industrial public firms at Amman Security Exchange, that is, and because of the characteristics of this sector like size, data availability and firms homogeneity, we distributed the questionnaires to the information technology managers for these firms. The study sample was selected on a comprehensive basis of all the Jordanian listed industrial public firms at Amman Security Exchange for the year 2011 (Amman Stock Exchange Thirteen's Annual Report, 2011) after excluding the firms under liquidation. According to that, one hundred thirty questionnaires were distributed, whereas only one questionnaire was distributed to each firm. Eighty two questionnaires were returned back and it was accepted for the analysis, which forms a response ratio of approximately 79.6%.

5. Data analysis and results presentation

We tested the validity and quality of the questionnaire by a number of professional and academic arbitrators, and we tested the reliability of the questionnaire by using the (Alpha Cornbach) test to measure scale tool consistency. The Alfa value was equal to 86%, which considered an excellent ratio as being higher than the accepted ratio of 60%.

The analysis of the first part of the questionnaires data indicated that 91% of tested sample are from information technology and computer specialization, and the rest ratio of 9% is from various specializations. This indicates that the sample includes scientifically qualified persons and they have the ability to deal with the Enterprise Resource Planning Systems (ERP). The analysis of the questionnaires data indicated that a percentage of (72%) of the respondents have a bachelor degree, and a percentage of (19%) of the respondents have master degree, and the rest have a diploma certificate. Analysis for the experiences showed that (42%) of the respondents have an experience from five to less than ten years, and (33%) of the respondents have an experience from one year experience to less than five years experience, and (18%) of the respondents have an experience from ten years to less than fifteen years experience, and lastly (7%) of the respondents have an experience which exceeds twenty years.

5-1- Hypothesis testing results

Table (2) below illustrated the simple linear regression analysis results for measuring the application extent of the detailed independent variables of: Sales & Marketing, Management & Production, Accounting & Finance, and Human Resources.

Table (2) Application extent results for the four components of the Enterprise Resource Planning Systems (ERP)

Component	Calculated Mean	Standard Deviation	T-test	Sig.
Sales & Marketing	64%	0.133	2.111	0.033a
Management & Production	57%	0.116	2.426	0.011a
Accounting & Finance	61%	0.121	2.343	0.021a
Human Resources	67%	0.112	2.273	0.042a

*T tabulated value is equal to: 1.671 at significant level of 5%.

Table (2) shows the results of measuring application extent for the four components of the Enterprise Resource Planning Systems (ERP). The statistical results for the first component of the Sales & Marketing Systems, indicated that the (calculated T = 2.111) is higher than the (tabulated T = 1.671) and according to that, we accept the first alternative sub-hypothesis (Ha$_{1-1}$) and reject the null sub-hypothesis (H$_{01-1}$), and that means that there is an application extent for the Sales and Marketing Systems as a part (sub-system) of the four applicable parts (components) of the Enterprise Resource Planning Systems (ERP) in the Jordanian public industrial firms. The calculated mean value for the same first component is equal to 64%, and that means that there is a medium application extent for the first component (sub-system) of the Sales & Marketing Systems in the Jordanian public industrial firms. Statistical results for the second component of the Management & Production Systems, indicated

that the (calculated $T = 2.426$) is higher than the (tabulated $T = 1.671$) and according to that, we accept the second alternative sub-hypothesis (Ha_{1-2}) and reject the null sub-hypothesis (H_{01-2}), and that means that there is an application extent for the Management & Production Systems as a part (sub-system) of the four applicable parts (components) of the Enterprise Resource Planning Systems (ERP) in the Jordanian public industrial firms. The calculated mean value for the same second component is equal to 57%, and this ratio is considered also as a medium application extent for the Management & Production Systems (sub-system) in the Jordanian industrial public firms.

The statistical results for the third component of the Accounting & Finance, indicated that the (calculated $T = 2.343$) is higher than the (tabulated $T = 1.671$) and according to that, we also accept the third alternative sub-hypothesis (Ha_{1-3}) and reject the null sub-hypothesis (H_{01-3}), and that means that there is an application extent for the Accounting & Finance Systems as a part (sub-system) of the four applicable parts (components) of the Enterprise Resource Planning Systems (ERP) in the Jordanian public industrial firms. The calculated mean value for the same third component is equal to 61%, and this result is close to the mean value of the first component, so we can also say that there is a medium application extent for the Accounting & Finance Systems (sub-system) in the Jordanian industrial public firms. Finally, The statistical results for the fourth component of the Human Resources indicated that the (calculated $T = 2.273$) is higher than the (tabulated $T = 1.671$) and according to that, we also accept the last fourth alternative sub-hypothesis (Ha_{1-4}) and reject the null sub-hypothesis (H_{01-4}), and that means that there is an application extent for the Human Resources Systems as a part (sub-system) of the four applicable parts (components) of the Enterprise Resource Planning Systems (ERP) in the Jordanian public industrial firms. The calculated mean value for the same fourth component is equal to 67%, and this value is also closed to mean value of the first part (sub-system) of the Sales and Marketing, so, we can say also that there is a medium application extent for the Human Resources Systems (sub-system) in the Jordanian industrial public firms.

6. Conclusions

This study aims to measure the application extent of a four main (parts) components of the Enterprise Resource Planning Systems (ERP) in the Jordanian public industrial firms, and these (parts) components are Sales & Marketing, Management & Production, Accounting & Finance, and Human Resources. In addition to that, classify the application extent in these firms to low, medium and high. The final sample was equal to 82 firms and based on the analysis of the results, the following conclusions can be made: First, there is a real level of usage and application for the four (parts) components of the Enterprise Resource Planning Systems (ERP) in the Jordanian public industrial firms which are: Sales & Marketing, Management & Production, Accounting & Finance, and Human Resources. Second, there is a medium application extent for these four sub-components of the Enterprise Resource Planning Systems (ERP) in the Jordanian public industrial firms.

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