

THE IMPACT OF ENTERPRISE SYSTEMS ON SMALL AND MEDIUM-SIZED ENTERPRISES IN THE KINGDOM OF BAHRAIN

Sekhar Muni Amba, New York Institute of Technology
Hussain Abdulla, New York Institute of Technology

ABSTRACT

The study explored the benefits of Enterprise Resource Planning systems to small and medium enterprises in the Kingdom of Bahrain on improvement in decision-making ability, employee performance monitoring, resource management, cost reductions, cycle time reductions and organizational benefits empowerment and achievement. Data collected through survey questionnaire from 48 SME's, of which 36 had implemented Enterprise System. The study found significant positive relationship between ERP implementation and improved decision-making ability, improved employee performance monitoring, the achievement of cost reductions and the achievement of cycle time reductions improved decision-making and performance monitoring. Thus, it is perceived, a wider adoption of Enterprise Systems by SME's in Bahrain can help them to expand and achieve business growth, thus contribute to the economic growth of Bahrain, in line with the ambitious goals of the Bahrain's economic vision 2030.

JEL: N85, Q55

KEYWORDS: ERP, SME, Bahrain Vision 2030, Bahrain

INTRODUCTION

Small and medium-sized enterprises (SME's) are a diverse group of businesses, active in various sectors and using varying levels of skill and technology (Lukacs, 2005). From a statistical point of view, the definition of SME's varies from country to country, and the definition is usually around criteria of number of employees, annual turnover or balance sheet size. The most commonly used criterion is number of employees, as it is the most readily available metric. For instance, the EU countries collectively define SME's as having fewer than 250 employees (European Commission, 2005), while the US defines SME's as having fewer than 500 employees (United States Small Business Administration, 2011). In Bahrain, the SME definition closely mirrors that of the EU, with businesses employing 11 to 250 employees defined as SME's (Ministry of Industry and Commerce, 2010). It is worth noting that the EU and US definition of SME's does not impose of lower limit on number of employees, as opposed to Bahrain, where any enterprise with 10 or fewer employees is classified as a microenterprise.

The contribution and importance of SME's in economic development has been recognized since the mid-20th century, as evidenced by the establishment of SME agencies and targeted policies by governments, such as in Japan in 1948, in the US in 1953 and India in 1954 (Organization for Economic Co-operation and Development (OECD), 2000). To quantify their contribution to the economy, a useful metric is SME's contribution to Gross Domestic Product (GDP). On a global level the contribution of SME's to a country's GDP varies from 16% in low-income economies to 51% in high-income economies (Ayyagari, Beck, and Demirgüç-Kunt, 2005). At the level of the Middle East and North Africa region, SME's are estimated to contribute 28% of GDP and represent 71% of private sector employment. SME's in Bahrain represent over 99% of active companies, they were responsible for 73% of private sector employment and they accounted for 28% of Bahrain's GDP (Dubai Media Incorporated, 2011).

Enterprise Systems were originally designed to integrate fragmented information in large enterprises that maintained separate information systems for their various functions and store large amounts of data. Before the introduction of Enterprise Systems this data was stored in various computer systems in their respective business units, geographic locations, factories or offices causing problems and inefficiencies due to lack of integration of various business functions. Enterprise Systems, also referred to as Enterprise Resource Planning Systems (“ERP Systems”), are software systems that integrates all functions and processes of a business, encompassing finance, accounting, human resources, supply chain management, inventory control, sales and logistics. The modular nature of an Enterprise System means that a company can choose which module it would like to implement. For SME’s, the Enterprise System used by large enterprises would most likely be unsuitable, as certain functions of an SME would not benefit from an Enterprise System due to their smaller size and the nature of their business. Through streamlining data flows and processes across various functions, Enterprise Systems can provide a range of productivity gains and benefits and can give executive management almost immediate access to real-time operating information. A few of examples of productivity gains by large enterprises that adopted Enterprises Systems are listed in Table 1 below (Seddon, and Shang, 2000).

Table 1: Example of Productivity Gains Achieved through adopting Enterprise Systems

Company	Process	Time Requirement	
		Before ERP	After ERP
IBM	Reprising of all products	5 days	5 minutes
	Part shipments	22 days	3 days
Fujitsu Microelectronics	Order cycle	18 days	1.5 days
	Financial closing	8 days	4 days

Table 1 shows effectiveness of ERP in two hi-tech firms

It is generally agreed that SME’s are a key component of economic growth and are a significant source of employment (Ayyagari et al, 2005). Across the globe, the governments of both developed and developing countries recognize the importance of SME’s and have taken various measures to support their growth (OECD, 2000).The government of Bahrain have recognized the importance of SME’s to economic growth, and as such has developed several institutions to support SMEs, most importantly Tamkeen , which has developed several programs to support SME development (Tamkeen Annual Report, 2011), and Bahrain Development Bank, which provides financing to SME’s (Bahrain Development Bank Annual Report, 2011). At the GCC Future Entrepreneurs Forum held in 2012, the Chairman of the Bahrain Development Bank, Sh. Mohammed bin Essa, summed up the economic and social importance of SME’s to Bahrain, stating that: “The development of Small and Medium Enterprises sector and the support and encouragement of entrepreneurship will contribute to the expansion of the middle income earners in all societies maintaining economic and social stability. “Hence, this study is significant to the government of Bahrain, and especially for Tamkeen (Bahrain Labor Fund) and Bahrain Development Bank, as it provides some recommendations on how to further support the growth of SME’s in Bahrain. This paper is organized into five sections: Introduction, Literature review, Data &Methodology, Data Analysis & Results, and Conclusion & Recommendations.

LITERATURE REVIEW

While there is extensive literature on the benefits of Enterprise Systems to large enterprises, as they were the first to implement such systems, the research on their benefits to SME’s is limited. Mukwasi and Seymour (2012) propose that the benefits framework proposed by Seddon et al. (2000) extends to SME’s, but their research also note that the risks of enterprise system implementations by SME’s is greater because of the associated cost, time and effort. Based on a review of the literature by Davenport (1998), Kumar et al. (2000), Seddon et al. (2000) and Mukwasi et al. (2012), the various benefits of

implementing Enterprise Systems to SME's can be classified as operational, managerial and organizational, which are detailed below.

Of the companies reviewed by Seddon et al (2000)., 75% listed that they had achieved operational benefits, such as improvements in productivity through automation of processes and cycle time improvement, through the implementation of an ERP system. Their research shows that Enterprise Systems can achieve the following operational benefits, also noted by Mukwasi et al. (2012) i) Productivity improvement: the automation of redundant workflows and redesign of processes reduces time spent by employees on such tasks and allows them to spend their time on other tasks, making them more productive, and allowing business to do more with fewer employees. ii) Promotion of e-commerce: enterprise systems facilitate integration of business functions, including manufacturing, order placement, finance and inventory, enabling online orders, real-time order inquiries, interactive online customer service, improved product design through online feedback and automated procurement from suppliers and sub-contractors. iii) Cycle time reduction: in various areas such as order delivery, production, customer service, payroll processing, orders to suppliers and other areas. iv) Quality improvement: through automation of redundant processes which may be prone to human or other errors. v) Customer services improvement: through integration of customer relationship management systems with other business functions.

At the core of an enterprise system is a centralized database where information on all business functions is stored, which allows for a range of managerial benefits such as generation of comprehensive reports, often using business intelligence tools, automated management of manufacturing and inventory and performance monitoring and management. Managers are able to monitor the business performance and make well-informed decisions, thereby boosting the company's performance. In Seddon et al (2000), research, 55% of the 233 companies review had achieved such managerial benefits, which are described as: i) Better resource management: integration of inventory systems with an enterprise system improves the quality and timeliness of inventory information, and improved inventory planning. ii) Better decision-making: business intelligence module, which can rapidly generate high-level reports customizable, reports on any aspect of a business operation. Managers are able to make timely and well-informed decisions using such reports. iii) Better performance control: Sales-specific modules allows for automation of target setting and allocation of sales resources, as well as monitoring of performance by geography, business line and individual sales employees.

Seddon et al. state that enterprise systems, through the automation of processes, can facilitate a flattened organizational structure, improve employee morale and support employee "common vision" communications. Of 233 companies reviewed by Seddon et al., 14% were reported to have achieved the organizational benefits listed as: i) Facilitate business learning and broaden employ skills: enterprises systems allow for processes to be learnt by all employees, they shorten the learning time and broaden employees' skills. ii) Empowerment: Enterprise systems, through formalizing and maintaining records of workflows, approvals and other activities, improve accountability and allow more value-added responsibility. They allow users to be more pro-active in problem solving and enable them to work autonomously. Middle managers become more involved in business management, and they begin to develop as planners rather than simply being doers. iii) Changed culture with common visions: Enterprise systems make interpersonal communication more efficient, they promote interdisciplinary thinking, coordinate and harmonize differences, and interdepartmental processes, hence facilitating a consistent vision across different levels of organization. iv) Improved employee morale: Enterprise systems allow employees to focus on core work, on their customers and the business operation. Employees can also spend more time on front office activities, as opposed to less engaging back office activities. Based on the literature review this study investigated the influence of ERP systems in managerial decision making, monitoring employee performance, resource management, cost reduction, cycle time reduction and organizational benefits in SMEs Bahrain The following hypothesis have been developed:

H1: The implementation of Enterprise Systems has a significant positive impact in management decision-making ability of Bahraini SME's

H2: Enterprise Systems have a significant positive impact in monitoring employee performance in Bahraini SME's

H3: Enterprise Systems are significant in resource management of Bahraini SME's

H4: Enterprise Systems are significant in helping Bahraini SME's achieve cost reductions

H5: Enterprise Systems are significant in cycle time reduction of different activities of Bahraini SME's

H6: Enterprise Systems are significant in the achievement of organizational benefits by Bahraini SME's

DATA AND METHODOLOGY

For the purpose of the research survey, a sample size of 48 Bahraini SME's were randomly selected from the Bahrain SME directory available from Bahrain's SME Development and Support Center and these companies were contacted personally to answer a survey questionnaire about Enterprise Systems in Bahraini SME's, and the benefits of these systems. The data was collected during March-April 2013.

A two-part survey was developed to collect data for analysis and hypothesis testing. The first part of the survey comprised 4 general questions about the company to determine sample characteristics. Questions included company turnover, number of employees, company sector and ERP systems existence. Enterprise System use by a sampled company was denoted by the variable ERP, which was a binary variable with a value of 1 denoting that a company had implemented an Enterprise System and a value of 0 for companies that had not. The second part of the survey comprised thirteen questions about the hypothesized benefits of the ERP system. The survey, respondents were requested to provide answers on a 5-point Likert scale (1= strongly disagree and 5= strongly agree).

Table 2 shows support of ERP systems to SMEs which are classified as i) Managerial decision support: measured by three items administrative decisions support, financial decision support and operational decision support ii) Monitoring performance of marketing and sales department: measured by one item iii) Resource management support: measured by four items operational sources, financial resources, administrative resources and inventory & company assets iv) Cost reduction: measured by one item v) Reduction of cycle time: measured by one item and vi) organizational support: measured by three items organizational change, empowering management and achieving mission and objectives.

For testing the six proposed hypotheses, a linear least squares regression equation is constructed for each of the hypothesis using ERP benefits as the independent variable and the responses to the questionnaire as the dependent variable. Survey responses relating to the items were averaged and dependent variables constructed. Table 2 also shows regression models used in this study such as $MAN = \text{constant} + \beta_1 \cdot \text{ERP}$ showing the influence of ERP on managerial decision making in SMEs.

Reliability of the survey questionnaire is measured by Cronbach's alpha, which is a good measure of internal consistency of the latent variable, and acceptable values are normally above 0.70. However, we can accept values near of 0.60 (Hair, et al., 2006), especially if the factor have only few items. While a value above 0.6 is sufficient, while a value above 0.7 is considered ideal (George and Mallery 2003). Cronbach alpha coefficient of this test data was 0.729, implying that the data is sufficiently internally consistent for further statistical analysis. SPSS software version 20.0 was used to conduct statistical analysis of the data using descriptive and ordinary least squares regression model to test each of the six hypotheses.

Table 2: Constructs and Dependent Variables Linear Regression Models

Enterprise System Benefit	No. of Items	Dependent Variable	Model	Regression Model(s)
Managerial benefit of improved decision-making... admin decisions ,operational decisions ,financial decisions	3	MAN	1	Managerial decision-making MAN = constant + β_1 ·ERP
Managerial benefit Performance enhancement : improved employee performance monitoring marketing and sales targets	1	TGT	2	Performance monitoring against targets TGT = constant + β_2 ·ERP
Resource management: improved resource management operational, financial administrative inventory	4	RES	3	Resource management RES = constant + β_3 ·ERP
Operational benefit cost reduction	1	COST	4	Cost improvement COST = constant + β_4 ·ERP
Operational benefit cycle time reduction	1	TIME	5	Cycle time reduction TIME = constant + β_5 ·ERP
Organizational benefits organizational changes, enhanced empowerment and objectives and mission	3	ORG	6	Organizational benefits ORG = constant + β_6 ·ERP

Table shows the constructs, regression models used and dependent variables with ERP as independent variable

RESULTS

Descriptive statistics of the variables annual turnover and number of employees are shown in Table 3 and 4 respectively. From Table 3, it is observed that out of a sample of 48 Bahraini SME's, 25% of the companies were very small with annual turnover of less than BHD 100,000 and 21% of the companies were relatively large with annual turnover of more than BHD 1,000,000. 23% of the sample companies had annual revenues between BHD 100,000 and BHD 250,000, and finally 31% had an annual turnover between BHD 250,000 and BHD 1,000,000, forming the largest sub-group within the sample in terms of annual turnover. In terms of number of employees as shown in Table 4, 78% of the sample companies had between 10 and 100 employees. Smaller SME's, with less than 10 employees, comprised only 12% of the sample, while the largest companies with number of employees between 100 and 250 comprised only 10% of the sample. 40% of the sample companies had between 10 and 25 employees, and another 38% had between 25 and 100 employees.

Table 3: Annual Turnover of Sampled Firms

Annual turnover	Number of firms
Below BHD100,000	12 (25%)
Between BHD 100,000 and BHD 250,000	11 (23%)
Between BHD 250,000 and BHD 1,000,000	15 (31%)
Above BHD 1,000,000	10 (21%)
Total	48 (100%)

Table shows number of sampled firms based on firm's annual turnover

Table 4: Number of Employees in the Sampled Firms

Number of Employees	Number of firms
Below 10	6 (12%)
Between 10 and 25	25 (40%)
Between 25 and 100	18 (38%)
Above 100 and 250	5 (10%)
Total	48 (100%)

Table shows number of sampled firms based on number of employees

Sector distribution of the sample is shown in Table 5. In terms of sector distribution, 80% of the companies were in either the Services sector (32%), the Supply and Trade sector (27%) or the Food and Retail sector (21%). Companies in the Contracting (8%), Manufacturing (8%) and other sectors (4%) together comprised 20% of the sampled companies.

Table 5: Sector Distribution of Sample Companies

Sectors	Number of Firms
Services	15(32%)
Supply and Trade	13(27%)
Food and Retail	10(21%)
Manufacturing	4(8%)
Contracting	4(8%)
Others	2(4%)
Total	48(100%)

Table shows number of sampled firms based on sectors

From Table 6, it's observed that out of the 48 companies, 36 (75% of the sample) had implemented ERP systems and the remaining 25% had not.

Table 6 ERP and SMEs

SMEs with ERP	SMEs without ERP
36	12

Table shows number of SMEs where ERPs are in use

The descriptive statistics for the mean response of surveyed items are shown in table 7. All means are above 3.5 with standard deviations ranging between 0.935 to 1.227, indicating narrow spread around the mean.

Table 7: Summary of Means and Standard Deviations (N=48)

Factors	Mean	Std.dev
Managerial Decision Support:		
Administrative decisions support	3.58	1.158
Financial decision support	3.69	1.203
Operational decision support	3.69	0.973
Monitoring performance of marketing and sales department	3.71	1.141
Resource management support:		
Operational sources	3.49	1.160
Financial resources	3.89	0.935
Administrative resources	3.56	1.167
Inventory & company assets	3.69	1.164
Cost reduction		
Cost reduction	3.51	1.014
Reduction of cycle time		
Reduction of cycle time	3.69	1.145
Organizational support:		
Organizational change	3.89	1.172
Empowering management	3.69	1.221
Achieving mission and objective	4.00	1.087

Table showing the average and standard deviation of the responses of surveyed items measured on 5 point Lickert scale 1=strongly disagree 5=strongly agree

Table 8 shows regression statistics summary of the models used in this study. Model one: $MAN = 2.917 + 0.898 \cdot ERP$, indicates ERP explains about 21.2 % variation in managerial decision making such as administrative decisions, operational decisions, and financial decisions and has positive impact on managerial decision making. Model 2 indicates ERP explains about 20.5% variation in performance monitoring against targets and has positive impact on monitoring employee target performance. Model 3 indicates ERP explains about 6.1% variation in Resource management: improved resource management operational, financial administrative inventory and has positive impact on resource management. Model 4 suggests that ERP explains only 16.4% variation on cost control and it has a positive impact on effective cost management. Model 5 indicates that ERP explains only 9.7% variance on cycle time reduction having positive impact. Model 6 indicates a very low explanatory power of ERP systems on

organizational benefits such as empowerment, organizational changes, achieving objectives and its mission. Observing p values from the table 4 suggests that hypothesis H1, H2, H3, H4, H5 are supported either at 5% or 1% level of significance and H6 is rejected. Beta values β_1 , β_2 , β_3 , β_4 and β_5 indicate implementation of ERP systems has significance impact on all dependent variables except organizational employee empowerment, objectives and mission.

Table 8: Regression Summary Statistics

Model	Regression Equation	Constant	Beta (t-value)	t-value of Beta coefficient	R ²	F-statistic	P-value
1	MAN = 2.917 + 0.898·ERP	2.917	$\beta_1=0.898$	3.516	0.212	12.362	0.001
2	TGT = 2.500 + 1.333·ERP	2.500	$\beta_2=1.333$	3.445	0.205	11.871	0.001*
3	RES = 3.222 + 0.370·ERP	3.222	$\beta_3=0.370$	1.729	0.061	2.991	0.090**
4	COST = 2.750 + 0.972·ERP	2.750	$\beta_4=0.972$	3.000	0.164	9.002	0.004*
5	TIME = 3.000 + 0.824·ERP	3.000	$\beta_5=0.824$	2.221	0.097	4.993	0.031*
6	ORG = 3.389 + 0.083·ERP	3.389	$\beta_6=0.083$	0.274	0.002	0.075	0.785

First two columns shows regression coefficients. R^2 shows explanatory power of independent variable on dependent variable and last column shows *significant at 5%, 1% and ** significant at 10% levels. t statistic of the explanatory variable shown in parenthesis.

CONCLUSION AND RECOMMENDATION

Aim of this research paper is to study the impact of ERP system on MSEs in Bahrain context. The relevant data was collected through a survey questionnaire during March-April 2013 and analyzed using statistical software SPSS version 20.0-. Ordinary linear regression analysis were used in testing hypothesis statements. One of the limitations of this research is time constraint and accessibility of SMEs and their willingness to participate in the survey thus a limited sample data. In light of the research by Davenport (1998), Kumar et al. (2000), Seddon et al. (2000) and Mukwasi et al. (2012), and the results of the regression analysis and the subsequent hypothesis testing, the research found that the use of Enterprise Systems by SME's in Bahrain provides significant positive managerial and operational benefits. In terms of managerial benefits, the management teams of SME's benefit from improved decision-making and performance monitoring, mainly through the use of business intelligence tools to automate the generation sales and other performance review reports.

In terms of operational benefits, SME's are able to benefit from cycle time reductions and cost reductions, through productivity improvements achieved by the automation of various business processes, workflows and integration with suppliers and customers. A wider adoption of Enterprise Systems by Bahraini SME's can help them to expand and achieve business growth, and contribute to the economic growth of Bahrain, both in terms of GDP contribution and employment creation, which is in line with the Bahrain's economic vision 2030. While the Government of Bahrain has implemented several policies to support SME development primarily through Tamkeen and through the Bahrain Development Bank, the research implies that Bahrain should develop specific policies to support SME's in adoption of various technologies. These technologies would include Enterprise Resource Planning Systems. Tamkeen, the Bahraini government entity concerned with job creation and SME development, currently provides a number of programs to support SME's, financially (Tamkeen Annual Report, 2011). Tamkeen should develop specific programs to promote acquiring and use of Enterprise System as these can require significant financial investments. Future research may include more sample data and other statistical analysis such as factor analysis

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BIOGRAPHY

Amba Muni Sekhar is Assistant professor at New York Institute of Technology. His research interest includes corporate governance, Investments, Corporate Finance and Leadership. The Author may be contacted at smuni@nyit.edu

