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Measuring the effect of e-business on organizational performance in project based organizations

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C H R O N I C L E

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A B S T R A C T

Recently, there have been significant development on e-business and nearly all business partners try to offer their products and services via internet. One primary question for the implementation of e-business is to measure the effect of this new facility on supply chain in project based organizations. Although e-business may not directly influence on organizational performance, it definitely influences on unifying customers and suppliers, which yields to a better performance of organizations. This study performs a study to measure the indirect effect of e-business on project based organizational performance. The proposed study of this paper designs a questionnaire and distributes it among 140 professional experts in different industries in province of Ontario, Canada. The survey examines different hypotheses for a possible correlation between e-business and integrated suppliers, e-business and customers, integrated customers and suppliers with organizational performance. The results of this survey indicate a positive relationship between all these components either directly or indirectly.

1. Introduction

One of the most essential issues for the success of any firm is to cope with advances in technology and apply new e-business applications to increase their performance. There are many studies to learn how e-business may influence on organizational performance. Ruiz-Mercader et al. (2006) studied the relationship between information technology and learning in small business units as well as their effects on organizational performance. They reported that individual learning along with collaborative information technologies could yield a positive effect on organizational learning. Wu and Chen (2006) executed a hybrid performance evaluation for e-business investments in high-tech manufacturing. They used performance measurement with a three-level structure of organizational hierarchy, including corporate strategies, manufacturing decisions, and operational activities and a time-lag effect and reported that time tag maintained positive effect on the performance measures of corporate strategies.

Sanders (2007) studied the effect of e-business technologies on organizational collaboration as well as performance and explained that organizational collaboration could be enabled only by the development

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and implementation of e-business technologies. Organizational collaboration and information sharing could also contribute organizational performance. The study suggested that the implementation of e-business technologies could influence on performance both directly and indirectly and Intra-firm collaboration had direct effect on organizational performance, indirectly.

Cegarra-Navarro et al. (2007) investigated the effect of the four learning processes introduced by Huber including knowledge acquisition, knowledge distribution, knowledge interpretation and organizational memory on four levels of e-business, including null, external, relational and internal through an empirical investigation of 130 SMEs in the Spanish telecommunications industry. They found that to use e-business, most corporations need to have the access of knowledge as prior steps. They also described that knowledge acquisition was essential to progress from relational level to internal level. Kim et al. (2008) investigated the effect of strategic positioning on firm performance in the e-business context.

Elbashir et al. (2008) proposed a new method based on the characteristics of business intelligence systems in a process-oriented structure. They used the measure in an examination of the relationship between the business process and organizational performance and reported substantial changes in the strength of the relationship between industry sectors.

Phillips and Wright (2009) studied the effect of e-business on organizational flexibility based on previous works through two surveys. They first implemented the results of 5 case studies to develop 7 factors including alliance/joint decision management and intelligence, enterprise-wide change management, organizational learning, process oriented agility, network centric information management, leadership of transformation and knowledge exchange meetings. They also described how the model could be implemented as benchmark and had the potential to become a key learning mechanism.

Wu et al. (2011) studied the capability of e-business on organizational performance in Chinese companies. They explained that previous investigations stated that firms' overall e-business success could yield a better organizational performance but they did not specify how a firm leverages e-business investment could lead to a bigger e-business success. They tried to determine the answers for two questions: What capabilities do they impact a firms' capability to establish e-business success and reach greater organizational performance, where the firm-level e-business success was measured by e-business service capability and IT-enabled collaborative advantage. They also investigated on whether the two ways of measuring e-business success could yield in different influences on organizational performance. The study was based on a survey data from 152 Chinese manufacturing firms and their B2B e-business systems participants to examine their theoretical hypotheses. The study revealed that both systems development and systems usage maintained substantial and positive effect on e-business service ability, which in turn could lead to bigger IT-enabled collaborative advantage. The findings were translated into the significant role of a firm's application ability of e-business on e-business success. The study also reported that the application capability of e-business could act as one of the primary mechanisms through which the e-business investment could lead to bigger e-business success. They also reported that IT-enabled collaborative advantage, compared with e-business service ability, had substantial influence on organizational performance.

Jiménez-Jiménez and Sanz-Valle (2011) investigated innovation and organizational learning on organizational performance. Wang et al. (2012) investigated some factors leading to the success of business-to-business (B2B) electronic marketplaces (EMs). They developed a model based on both organizational capability and market opportunity theories to determine the performance of B2B EMs. Their results implied that the research model could explain the performance of B2B Ems and among the two service capabilities studied, service width contributed substantially to EM performance, while the effects of service depth were yet to be seen. Besides, the enabling organizational abilities and market opportunity items influenced EM performance both directly and indirectly through their enhancement of EM service provision capability.

Braglia and Frosolini (2014) proposed an integrated method to use project management information systems within the extended enterprise. Soto-Acosta et al. (2016) extended past studies on the organizational effect of Internet technologies by analyzing factors influencing e-business usage and its effects on organizational innovation in manufacturing Small and Medium-Size Enterprises (SMEs). They also analyzed the mediating impact of organizational innovation on the relationship between e-business and firm performance. Their results indicated that e-business usage could contribute positively to firm performance through organizational innovation. Chuang and Lin (2017) performed an investigation on the performance implications of information-value offering in e-service systems by examining the resource-based perspective and innovation strategy.

The proposed study of this paper tries to study the effect of e-business on organizational performance in project based organizations. The proposed study of this paper designs a questionnaire in Likert scale and distributes it among 140 professional experts in industry in a province of Ontario, Canada. The survey investigates four hypothesis for a possible correlation between e-business and integrated suppliers, e-business and customers, integrated customers and suppliers with organizational performance.

2. The proposed model

E-business plays an essential role for the development of today's business units and enterprises. Many project based organizations need a strong infrastructure for development of their activities. Integrated structure in information along with production planning demonstrates information identity need to be shared within a supply chain and cooperation among various employees contributes to the quality of the information. Information sharing is divided into the data based on demand and supply. The information related to demand are demand prediction, customer classification and customer relationship management. Integrated information is based on enhancing suitable strategy for ordering products and various levels of inventory and production planning. Information sharing always helps most components of supply chain to give suitable plans a head of time.

2.1 e-business

An integrated supply chain is normally measured based on various factors such as sales prediction, master schedule, cooperation among project managers to provide appropriate requirements, etc. Demand prediction leads to better project management and material requirement planning. Information sharing across various business units using recent advances of internet and its infrastructures helps improve supply chain management. Therefore, the following two hypotheses are considered,

H1: e-business influences integrated customers, positively.

H2: e-business influences integrated suppliers, positively.

2.2 Organizational performance

It appears that a better level of integration in supply chain provides better advantages in project based organizations. It can increase sales, quality, delivery time and changeability. Therefore, it makes sense to consider the following two hypotheses for the proposed study of this paper,

H3: A higher degree of customer integration improves organizational performance.

H4: A higher degree of supplier integration improves organizational performance.

Fig. 1 shows details of the proposed study of this paper.

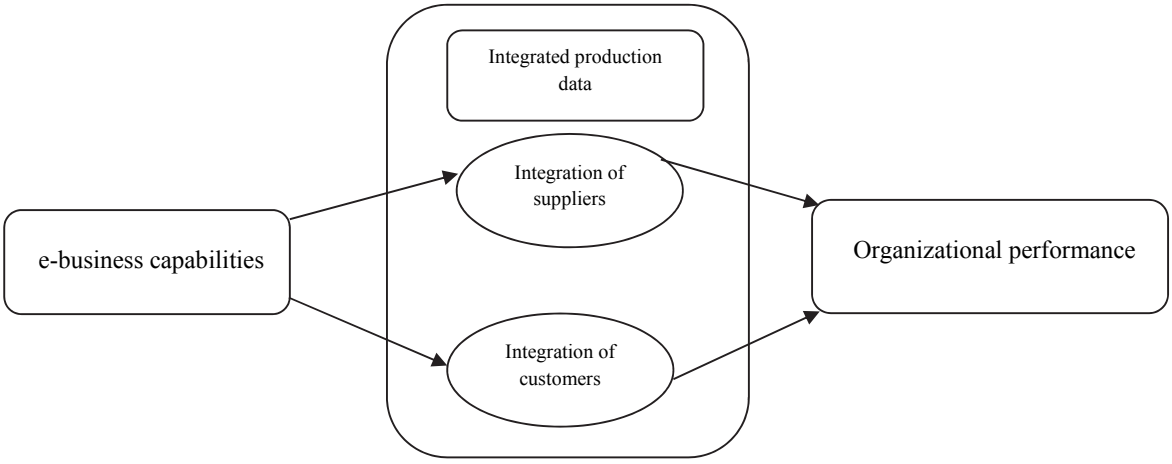

Fig. 1. The proposed model

3. The results

In this section, we provide the details of the survey performed among 140 industry experts who were involved in various industries in province of Ontario, Canada. The questionnaire was designed in Likert scale and 140 randomly selected experts from were selected and all filled questionnaires were collected. The implementation of Kolmogorov–Smirnov has indicated that the data were normally distributed. Therefore, we use Pearson correlation to examine different hypotheses of this survey.

3.1. e-business capabilities and integrated suppliers

Table 1 demonstrates the results of the Pearson correlation test between e-business capabilities and having a reliable integrated supplier in project based organizations.

Table 1
Pearson correlation test between e-business and integrated supplier

Variable	Standard deviation	Pearson correlation ratio	Degree of freedom
e-business capabilities	0.878	0.922	140
Integrated suppliers	0.967		140

As we can see from the results of Table 1, there is a positive relationship between e-business capabilities and integrated suppliers with the significance level of 99% in project based organizations.

3.2. e-business capabilities and integrated suppliers

Table 2 presents details of the Pearson correlation test between e-business capabilities and having a reliable integrated customers in project based organizations.

Table 2
Pearson correlation test between e-business and integrated customer

Variable	Standard deviation	Pearson correlation ratio	Degree of freedom
e-business capabilities	0.856	0.887	140
Integrated customers	0.921		140

Based on the results of Table 2, there is a positive relationship between e-business capabilities and integrated customers with the significance level of 99% in project based organizations.

3.3. Integrated suppliers and organizational performance

Table 3 shows details of the Pearson correlation test between a reliable integrated supplier and organizational performance in project based organizations.

Table 3
Pearson correlation test between integrated supplier and organizational performance

Variable	Standard deviation	Pearson correlation ratio	Degree of freedom
Integrated suppliers	0.899	0.826	40
Organizational performance	0.954		40

As we can see from the results of Table 3, there is a positive relationship between integrated suppliers and organizational performance with the significance level of 99% in project based organizations.

3.4. Integrated customers and organizational performance

Table 4 presents details of the Pearson correlation test between a reliable integrated customer and organizational performance in project based organizations.

Table 4
Pearson correlation test between integrated customer and organizational performance

Variable	Standard deviation	Pearson correlation ratio	Degree of freedom
Integrated customer	0.890	0.831	40
Organizational performance	0.971		40

Based on the results of Table 4, there is a positive relationship between integrated customer and organizational performance with the significance level of 99% in project based organizations.

In summary, all four hypotheses have been confirmed when the level of significance was set to 0.99, which means the relative importance of e-business on organizational performance in project based organizations.

4. Conclusion

We have investigated the relative importance of e-business on improving the importance of project based organizations. The recent advances on information technology have created the opportunities to reduce cost components, which helps increase the productivity of the organizations. We have investigated the impacts of e-business on organizational performance via integration of supplier or customer in a province of Ontario, Canada. The results of this paper have indicated that the e-business could substantially improve the performance of project based organizations. The results of this survey are consistent with the results earlier proposed by Meftahi et al. (2012) and represented a positive correlation between implementation of e-business and organizational performance.

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