

The Effect of E-Commerce on SME Performance

Amir Sedighi and Behroz Sirang

Management Department of Islamic Azad Universities, Jolfa International Branch, East Azerbaijan, Iran

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ABSTRACT

In recent decades with development of internet, the e-commerce has been recognized as an instrument for organizing the business model. In applying the e-commerce, the large firms generally face lower financial and infrastructural barriers while the small to medium enterprises face with resource limitations, particularly the financial resources in applying this tool. Hence, the main objective of this research is to investigate the effect of e-commerce on Small to Medium Enterprises (SME) performance. This research is a descriptive-correlative research. The population of this research involves all managers of SMEs in Tehran which was determined to be 373 subjects based on Kerjcie Morgan table as the sample size. The researcher administrated questionnaire was provided based on studies (Soto-Acosta et al. 2015, 2015). The data analysis was based on structural equation modeling. In this research, the partial least square was also used. The results indicated that using the e-commerce is significantly effective on SME performance and e-commerce application is significantly effective on performance elements such as financial performance, internal process, customers, growth and learning. The relationship between e-commerce and performance and its elements was also moderated by innovation.

Introduction

One of the most important opportunities for facilitating the business and competitiveness enhancement worldwide is to apply the novel information and communication technology (ITC). The e-commerce is one of the most important products and the result of this technology which can be a suitable opportunity for different countries in their domestic and international exchanges (Huo et al. 2015). The e-commerce concentration is to make use of IT to provide the external activities, business relationships with other individuals, groups and businesses. The small to medium enterprises (SMEs) have been one of the focal points in many employment development practitioners' perspectives due to advantages and significant capacities such as high flexibility, entrepreneurship growth and development, raising and emerging potential innovative and creative areas, high potential to attract working force and supply expert human resources for large firms (Shabani, 2015). Raymond and Bergeron (2008) explained that many of the SMEs are of e-commerce capabilities and they, in turn, could obtain more positive results among competitors who couldn't develop such capabilities. Srinivasan, S. S., Anderson, R., & Ponnayolu, K. (2002) stated that in investigated firms, the easy communication particularly communication with customers and international trading firms are

significant advantages of using internet. The most significant application of internet communication for small firms is e-mail. In addition, this is argued that different businesses and industries have different attitudes toward applying internet. Therefore, there is only one conditional model which can be changed between different applications would be useful in employing internet by SMEs (Ismail and King, 2014). Internet needs relation-based marketing and provides the customers with long-term services and relationship (Devara et al. 2007). In fact, marketing is an interactive process which provides relationships in a social space and what is important is that to what extent the internet business is applicable in an organization and how can it be assessed. The firms' performance in e-commerce literature has been measured based on subjective actions in several studies and using the objective measures (Loukis et al. 2013; Meroño-Cerdan and Soto-Acosta, 2005, 2007; Zhu, 2004). Besides, many studies analyzed the direct relationship between business and firm's performance while there are few studies conducted on identification of variables in this relationship. Therefore, the main goal of this research is to investigate the effect of e-commerce on SMEs' performance.

The e-commerce concept and fundamentals

European commission (EC) (1997) defined the e-commerce as: e-commerce is based on electronic transference and processing of data such as text, voice and image. The e-commerce encompasses different activities such as goods and services e-exchange, digital demands immediate delivery, money e-transfer, stock e-exchange, e-bill of lading, business plans, direct marketing and post-sales services (Azadi and Isavand, 2016). E-commerce means taking all actions of enterprises and individuals to exchange in a fully electronic environment such that all or parts of these activities are conducted via the computer networks like internet. The e-commerce refers to electronic processes conducting aims at money exchange, goods, services and information delivery (Jafar Nejad et al. 2009). As one of the commentators of e-commerce, Turban (2004) defined the e-commerce and its applications. These applications include direct marketing, job search, online banking, mobile business, retailers, e-government, e-purchase and online publishing which indicate the extension of Turban's view on e-commerce. Turban considered this type of business including business partners in e-exchange markets, supportive services, marketing, ads and government tax policies as well as technical regulations, rules and standards. In fact, the e-commerce can be defined from different perspectives. In term of communications, this means delivering goods, services and information or payment using the computer networks or other electronic devices such as mobile phone or even via TV (Turban et al. 2009). Iran is novice in term of e-commerce and there is a long way for this country to reach the acceptable level of this area. Novel technology in this area addresses new requirements in processing and exchanging data, instruments and suitable infrastructures to implement it (Araste et al. 2015). In fact, in case of lacking infrastructures in IT and internet to provide electronic services and lack of flowing and accurate banking system, financial and custom regulations, lack of information security, lack of respecting the copyright, lack of consistence between national and international regulations as well as lack of high-speed internet lines, there would not be any e-commerce growth observed even in minimum level in Iran; however, there have been some effective steps taken in line with internet and IT, there is a large distance with other countries in this regard (Monavarian et al. 2014). E-commerce success largely depends on targeting the information needs such as information about agriculture productivity rates, land documents rights, computer tutorials, certificates related to Indian hereditary social classes, online services, handling the public complaints, online hygiene services, e-mail, rural e-bids, marriage, information of public plans, children-specific information, online job exchange, availability of employment demand, local weather reports and e-newspapers. In addition, it is necessary to target women who work as farmers in many countries by ITC services (Hashemi, 2010).

The role of SMEs in economy

Based on figures obtained from Iranian industrial workshops, the industrial workshop complex with 10-49 workers are small enterprises, with 50-149 are medium enterprises and with more than 150 workers fall into the large enterprises category (Shafie Nik Abadi et al. 2010). In Tapescott's view (2000) growth in innovative economic originates from SMEs more than the large and public ones. In addition, these enterprises would be largely effective on economy and human lives. About 80% of all firms worldwide employed less than 10 working force which is 95% for England, 94% for Spain and Finland and 79% for USA. The firms with less than 10 human forces are different in various countries. In Ireland, 85% of firms are with less than 10 human forces (Maguire, S., Koh, S. C. L., & Magrys, A. (2007). In Iran, 92% of the firms are small to medium sized and these enterprises employed 56% of the working force (Rezvani and Ruhani, 2013). These enterprises play an important role in job opportunities creation for society members and have large share of the employment. The innovation resources in goods, services, process and working experience are new and provide a major part of countries economic structure with goods and services supply (Dehkordi et al. 2014). SMEs are active in certain points and particular markets to which the large enterprises are not able to enter (Leitao et al. 2013). Particularly, in production sector there are many small industries supplying the parts, spares and sub-assemblies in expert level and in fact they are the contractors of large industries. They play the role of productive economy foundation which ensures the progress, flourishing and success of large industries. The small industries form the large industries performance, because their performance is directly dependent on SMEs (Monavarian et al. 2014).

E-commerce employing in SMEs

There is difference between small and large enterprises in term of employing e-commerce and in fact, the small enterprises are not small model of the large ones. Generally, the SMEs are more faced with risk in employing the e-commerce than the large enterprises, because they don't have sufficient resources for investment in training. Stewart, R (2003) studied how to make decision on accepting ITC in small enterprises. In this research, they used the integration of planned behavior theory and technology acceptance mode both of which were used in IT in small industries (Soto-Acosta, 2014). Studies about the small firms focused on particular types of technology, the electronic data interchange is an important example of these technologies which is similar to internet. Raymond, L., & Bergeron, F. (1996) believe that there are 3 factors effective on using EDI in small enterprises, i.e. image of EDI advantages in organization, organizational readiness and external pressure on organization to employ technology. In a similar study, Chau, P. Y., & Hui, K. L. (2001) found similar factors effective on EDI application in 286 SMEs. Raymond, L., & Bergeron, F. (1996. mentioned that external pressure is the most important factor effective on EDI application Kuan, K. K., & Chau, P. Y. (2001) determined the effective factors on using EDI in SMEs using the technology, organization and environment framework. The technology included perceived direct and indirect advantages of EDI. Organization factor included the financial costs and technical expected capability and the environmental factor was similar to external pressure in Yakovo et al. but there was an extra variable, i.e. image of public pressure. In this model, the image of indirect advantages was not an important factor. Therefore, in analysis of technology application in e-commerce newly emerging area, there is an overlooking and there is evidence that effective factors in large firms can be effective on internet employment in SMEs.

Methodology

Since the main goal of this research is to investigate the effect of e-commerce on SMEs' performance, the research would be applied in term of goal. In term of data collection, this is a

survey research. In term of observation ad control level, this is a field study and the data analysis procedure would be descriptive-correlative. In addition, in order to gather statistical data, the field study was used. In this procedure, in order to obtain the statistical data, the questionnaires were distributed among the population. The population of this research includes all SMEs in Tehran with at least 10 employees. The sample size was determined based on Kerjcie-Morgan’s table. The sampling method was the simple random sampling due to limitation of the target population. The data analysis also was based on structural equation modeling. In this research, the PLS was used. this technique provides the investigation of relationship between latent variables and measures (observable variables) simultaneously. This procedure is used when the sample size is small or the variables are not normally distributed. The conceptual model of this research is based on Poppa et al. (2014). In this model, the independent variable is the e-commerce and the dependent variable is SMEs performance (operational costs and asset gain) and the moderating variable would be the organizational innovation.

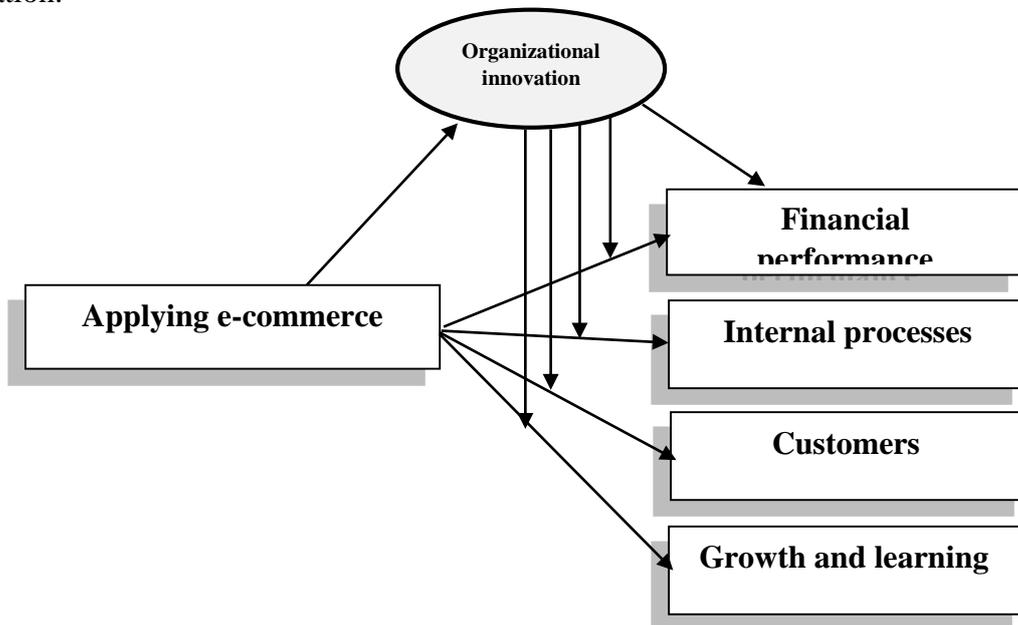


Figure1. The research conceptual model

The descriptive statistics of this research variables

Table1. descriptive statistics of research variables

	N	Minimum	Maximum	Mean	Std. Deviation
e-commerce employment	267	2.00	5.00	3.5431	.82926
Financial performance	269	1.67	5.00	3.4634	.73641
Internal processes	270	2.00	5.00	3.4123	.84309
Customers	271	2.00	5.00	3.6261	.68882
Growth and learning	266	2.00	5.00	3.8371	.72813
Organizational innovation	271	2.00	5.00	3.6664	.76557
Valid N (listwise)	253				

Based on the results of table 1, it is observed that growth and learning has the man value of 3.8. In addition, SD of this variable is 0.72 which indicates the high dispersion of this variable in Likert’s spectrum. In addition, it can be seen that the lowest value of mean is for the internal processes with value of 3.41 whose SD is 0.83. In fact, this is inferred that higher SD indicates more variations in data and values calculated for the variables.

Inferential findings

The inferential findings at first explain the normality of the data and then generally the distribution of variables. The normality investigating test in this research was Kolmogorov-Smirnov test. After testing the normality of the variables in this research, based on their distribution the parametric or non-parametric tests would be used to confirm the hypotheses.

Table2. The Kolmogorov-Smirnov test

	E-commerce employment	Financial performance	Internal processes	Customers	Growth and learning	Organizational innovation
N	267	269	270	271	266	271
Normal Parameters ^{a,b}	Mean 3.5431 Std. .82926	3.4634 .73641	3.4123 .84309	3.6261 .68882	3.8371 .72813	3.6664 .76557
Most Extreme Differences	Absolute .158 Positive .158 Negative -.103	.105 .105 -.092	.128 .128 -.120	.122 .122 -.121	.092 .089 -.092	.072 .072 -.068
Test Statistic	.158	.105	.128	.122	.092	.072
Asymp. Sig. (2-tailed)	.000 ^c	.000 ^c	.000 ^c	.000 ^c	.000 ^c	.002 ^c

According to the results, it is observed that distribution of variables studied is not normal with significance level lower than 5%. Therefore, the non-parametric tests would be used to test the hypotheses.

Table3. Spearman's correlation matrix

		E-commerce employment	Financial performance	Internal processes	Customers	Growth and learning	Organizational innovation
Spearman's rho	E-commerce employment	1.000	.536**	.507**	.384**	.432**	.415**
	Correlation Coefficient						
	Sig. (2-tailed)	.	.000	.000	.000	.000	.000
	N	267	263	264	265	260	265
	Financial performance	.536**	1.000	.489**	.484**	.430**	.544**
	Correlation Coefficient						
	Sig. (2-tailed)	.000	.	.000	.000	.000	.000
	N	263	269	266	267	264	267
	Internal processes	.507**	.489**	1.000	.363**	.345**	.480**
	Correlation Coefficient						
	Sig. (2-tailed)	.000	.000	.	.000	.000	.000
	N	264	266	270	268	263	268
	Customers	.384**	.484**	.363**	1.000	.584**	.764**
	Correlation Coefficient						
Sig. (2-tailed)	.000	.000	.000	.	.000	.000	
N	265	267	268	271	266	269	
Growth and learning	.432**	.430**	.345**	.584**	1.000	.702**	
Correlation Coefficient							
Sig. (2-tailed)	.000	.000	.000	.000	.	.000	
N	260	264	263	266	266	264	
Organizational innovation	.415**	.544**	.480**	.764**	.702**	1.000	
Correlation Coefficient							
Sig. (2-tailed)	.000	.000	.000	.000	.000	.	
N	265	267	268	269	264	271	

** . Correlation is significant at the 0.01 level (2-tailed).

Based on the results of table 3, it is concluded that the relationship between variables with lower than 1% of significance levels is in reliability level of 99% which indicated the

significant relationship. In addition, if the correlation coefficient was closed to 1, it would indicate the strong correlation and weaker correlations would be related to coefficients closed to 0.

Generally, it can be explained that using e-commerce is in significant relationship with financial performance, internal processes, customers, growth and learning and innovation with significant level lower than 0.01 and correlation coefficient of 0.536, 0.507, 0.384, 0.432 and 0.415, respectively. Finally, the external correlation condition of the variables in this section was confirmed. To test the conceptual model of this research, the PLS as a variance-based path modeling technique is used. This technique provides the investigation of latent relationships and measures (observable variables) investigation, simultaneously. This technique can be used when the sample size is small or the variable distribution is not normal. In PLS models, 2 models are used: the outer and inner model. The outer model is like CFA measurement and inner model is like the path analysis in structural equation modeling. After testing the outer model, it is necessary to provide the inner model which indicates the relationship between latent variables. Using the inner model, it is possible to test the hypotheses of this research.

The beta coefficient in general model

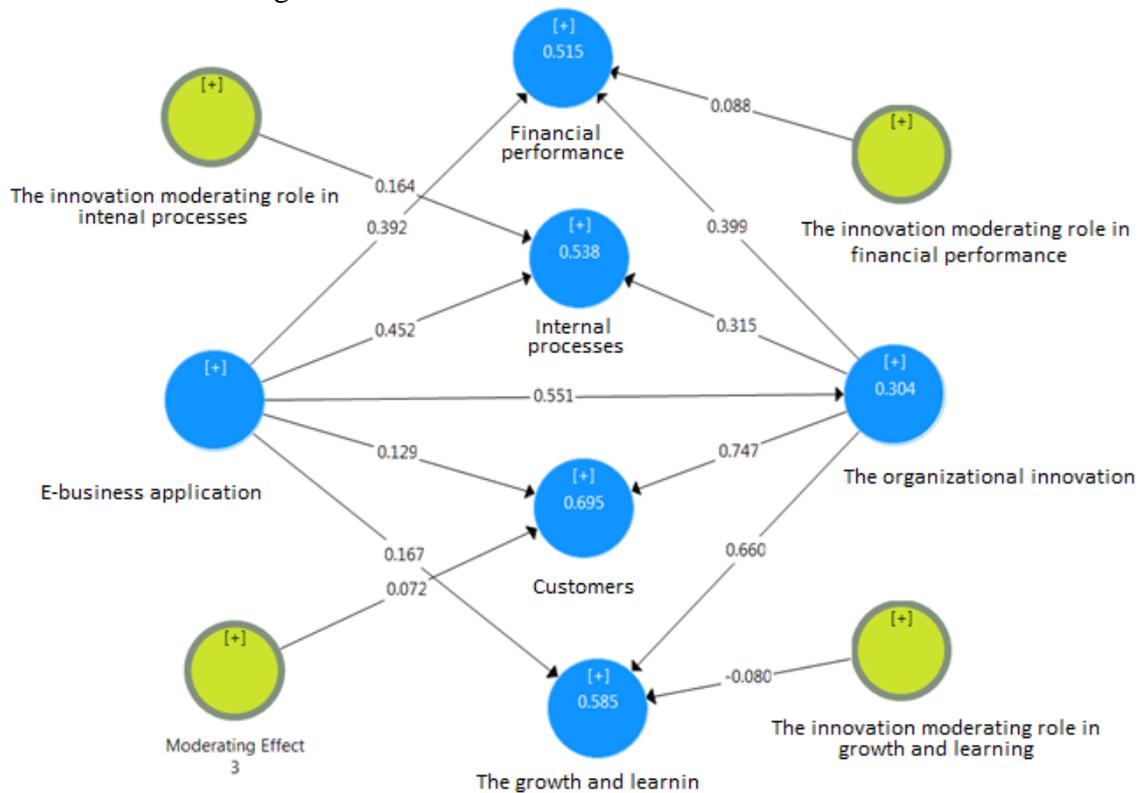


Figure2. The model in term of beta coefficient in general model

The beta coefficient can be between 0 and 1. The stronger relations naturally indicate higher coefficient.

T coefficient in general model

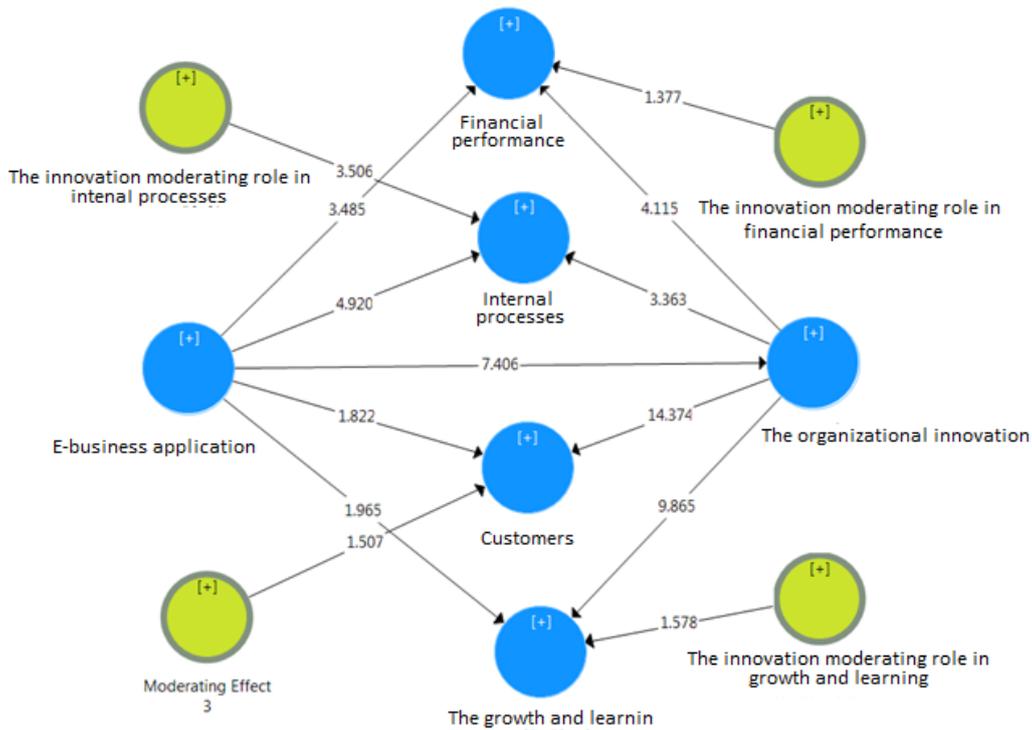


Figure3. The model in term of t coefficient in general model

Regarding the t coefficient, this is important to note that in reliability level of 95% in which the model is provided, the numerical value less than 1.96 indicates the undesirable relationship between variables.

Regarding the results obtained from the models provided in this section it can be stated that the moderating effects of innovation on relationship between growth and learning, customers, internal process and financial performance with beta coefficient of 0.80, 0.0720, 0.166 and 0.088 are significant. In other word, the innovation plays the moderating role in growth and learning, customers, internal processes and financial performances in SMEs in using the e-commerce. In addition, it is observed that the e-commerce is effective on growth and learning, innovation, customers, internal process and financial performance with desirable beta coefficient.

The fitness goodness index

Table4. The model goodness index (general model)

	Saturated Model	Estimated Mo...
SRMR	0.108	0.109
d_ULS	2.466	2.505
d_G1	1.116	1.130
d_G2	0.976	0.991
Chi-Square	504.426	506.779
NFI	0.519	0.517

Based on the results of this table, it can be observed that the NFI with numerical value of 0.519 is acceptable. The NFI which is called the Bentler-Bount index is acceptable for values more than 0.09 and indicates the model fitness. This index tests the improvement level via comparing an independent model in which there is no relationship between variables with the proposed model. In addition, the Chi-Square statistic value is 504.26 and the final limit of this statistic

teds to infinity and the higher values indicate the models higher goodness. The Chi-square test tests the hypothesis that proposed model is observed in coordination with interconnection pattern between variables. The Chi-square quantity is highly dependent on sample size and the larger sample increases the quantity of Chi-square more than what can be attributed to model's wrongness. The other important index in this section is SRMR value. The value of this index is 0.1. The RMSR means the root mean square residual. The RMR is an index used for residual variance in fitness of each parameter to the sample data or to measure the residual averages and is only variable in relation with variances or covariance. The more this variable tends to 0, the more the goodness of model would be.

Determination coefficient

The determination coefficient is the R². This coefficient explains the model prediction power. The values of this statistic between 0 and 1 indicate the prediction power in model. The more this statistic tends to zero, the more the predictive power of model would be.

Table5. The numerical values of determination model in fit models (general model)

	R square	R square adjustment
Growth and learning	0.585	0.572
Financial performance	0.515	0.500
Internal processes	0.538	0.523
Customers	0.695	0.685
Organizational innovation	0.304	0.297

Based on the results obtained in this section, it can be observed that the models in the general model are of suitable power (the coefficient with values of 0.4-0.6).

VIF collinearity index

Table6. The numerical values of determination coefficient in fit model (general model)

	Growth and learning	Financial performance	Internal processes	Customers	Organization al innovation
Moderating effect				1.057	
e-commerce employing	1.517	1.517	1.517	1.517	1.000
Growth and learning					
Financial performance					
Internal processes					
Customers					
The moderating role of innovation on growth and learning	1.057				
The moderating role of innovation on financial performance		1.057			
The moderating role of innovation on internal processes			1.057		
Organizational innovation	1.455	1.455	1.455	1.455	

Based on the results obtained in this table regarding the coefficient, it can be observed that the collinearity phenomenon is not observed and the results are reliable.

Conclusion

Based on what explained in this research, the significance of the SMEs as well as increasingly importance of the e-commerce, it is important to investigate how to facilitate the entrance of SMEs to e-commerce field. The e-commerce generally is a channel for SMEs to enter the global markets. However, there are potential opportunities, many of SMEs don't will to enter the e-commerce field. In addition, e-commerce growth among the SMEs was lower than what is expected and it seems that particular firms and organizations can enter this area and a revision is necessary to investigate and recognize the issues due to entering the e-commerce area. Based on the results obtained, the e-commerce is capable of reducing the operational and non-operational (administrative and supporting) costs. The e-commerce due to increase of speed, accuracy and communication improvement between internal and external sections, reduces the operational costs. Finally, the e-commerce reduces the marketing and advertisement costs. In addition, using this type of business with beta coefficient of 0.452 is effective on the firms' internal activities. In addition, using the e-commerce with beta coefficient of 0.129 is effective on customers. The firms can enter the global market area using the internet which changes the customer's attitude toward the geographical borders and transforms the business structure. In modern competitive world, the increase of organizational knowledge about the customers' attitude toward the e-services provided is of high importance in achieving the goals. In order for organizations to take more active and effective actions in providing the customers with services and goods and consequently to result in the customer's satisfaction, the knowledge of customers has to be managed so that the services provided for customers by organization would be responsive to their needs. Therefore, the knowledge management is an inseparable part of customer relation management and e-commerce. Accordingly, at present the innovation is the most important driver to achieve the competitive advantages in many industries. The innovation importance enhancement is partially due to globalization of markets. The global competition pressurized the firms in different industries to produce different products and services and take innovative actions constantly.

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