

## EXPLAINING THE IMPACT OF INFORMATION TECHNOLOGY CAPABILITIES AND ORGANIZATIONAL ACCELERATION ON PERFORMANCE OF BANKING SECTOR

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### ABSTRACT

This study aimed to explain the effect of information technology capabilities and organizational acceleration on performance with the role of innovation capacity moderator in the banking sector of Mazandaran province of Iran during 2020-21. The statistical population of the study includes 1400 people. In order to determine the sample size based on Cochran's limited formula, the number of samples in this study was set at 302, which were selected by simple random sampling. We collect the primary data through fieldwork, and the instrument of primary data collection was five-choice Likert questionnaires, and also library method was used to collect secondary data. Both content and formal methods were used for the validity of this questionnaire, and we analyzed its reliability with Cronbach's alpha that the overall reliability is equal to 0.906. Structural equation modeling using smart PLS software was also used to test the research hypotheses. The results showed that information technology capabilities and innovation capacity have a significant relationship with organizational acceleration. In addition, Organizational acceleration has a significant relationship with organizational performance, and innovation capacity in the relationship between IT capabilities also has a moderating role on organizational acceleration.

Keywords: Information technology capabilities, Organizational Acceleration, Organizational Performance, Innovation Capacity, Banking Sector.

### INTRODUCTION

In today's world, the importance of information technology capabilities to achieve speed and focus on the various activities of organizations and the relationship between different components and ultimately improve their productivity has become clear. Especially the different parts of organizations that are located in scattered and distant geographical areas. Also, organizations that have different responsibilities in their area of operations are using this technology to solve many of their problems. With the advancement of information technology along with the industrial revolution, the term "information and communication revolution" has found a new meaning. However, in the Industrial Revolution, a variety of factories, tools and machines, automobiles, etc. have emerged to help humans and have taken over most of their physical activities. A variety of products and information technologies have emerged and expanded to help people dealing with information, such as computer hardware and software, and computer and telecommunication networks, satellite systems, and so on. In recent years, the world has witnessed the development of the information and communication revolution, which has brought about far-reaching social changes, so that as a result of these developments,

the current century has been registered under the name of information and communication technology. (Sadeghiani et al. 2017)

In the era of communication and information, the level of insight and awareness of people has increased and all the activities of the growing world population have been balanced and controlled in the form of communication networks with the benefits of this period. By evaluating and comparing different organizations and companies, it has been found that the capacity of innovation is the driving force for economic growth and development. So that today many policy makers are interested in expanding and increasingly productive innovation policies (Nasrollahi et al., 2015) . In other words, today there is endless competition between organizations due to factors such as environmental changes, technological advances, and the increase of competitors, so organizations will be more successful if they respond to environmental changes as well as development. New capabilities are more likely to be accepted to further encourage innovation that will help them to achieve higher performance. (Ardakani et al., 2016).

Nowadays, a very powerful tool called IT capabilities has emerged that has had a tremendous impact on life. Moreover, with its rapid influence, it has entered the field of science and practice and created indescribable changes in various fields including cultural, social and educational. (Ardakani Et al., 2016). Due to the special importance for the development of human resources in the national development program and the application of communication technology in Iran, the broader and faster development of this communication infrastructure is considered an important priority.

The use of information technology provides better access to information in the shortest possible time in a way that expands the workforce by optimally saving time and money and directing the workforce to effective and productive activities (Olson and Et al., 2016)<sup>1</sup>. In many related studies, the results showed that with the development of organizations and their more complex environment and also the increasing competitiveness between organizations, the use of information technology to increase efficiency and effectiveness in any organization, coordination between units has emerged. The path of change has led to the growth and development of information technology capabilities. In the era of information technology, different societies have embarked on different solutions to solve their economic, social and cultural problems, among which the capacity for innovation is an important requirement for competing in the 21st century. . Due to a number of problems such as increasing competition, frequent environmental changes and environmental uncertainties, organizations are forced to accept innovation capacity as an important part of their strategy. The open and active space for new ideas, as well as the search for such ideas, shows the tendency of innovativeness as a strategic behavior. The degree and intensity of innovation capacity are considered as an important gateway to business success, that is, the ability of a company to use innovation capacity; processes, products and ideas are relevant to the market and the organization. In general, innovative activities are very important for the success of companies. (Holt et al. 2, 2017)<sup>2</sup>.

In banking, dealing with an efficient and advanced banking system is inevitable and it is impossible to imagine banking without information technology capabilities. Thus, information technology capabilities are the main axis of value creation in the banking system.

Due to this presence and active role, Iranian banking has taken steps in line with global trends and despite the underdevelopment of sectors and financial instruments in the sector, tremendous progress has been made. However, many steps still need to be taken to develop Iranian banking in terms of information technology capabilities and ultimately improve performance. (Torabzadeh et al., 2018).

To maintain the competitive advantage and organizational survival of companies, special attention should be paid to the innovation capacity and organizational acceleration of the product or service. Also, the proper use of the available opportunities due to the speed and high volume of information and technological advancement is one of the challenges for organizations. To achieve these goals, the managers of the organization must provide the effectiveness of investment in IT capabilities on the acceleration of the organization. According to the research background, information technology capabilities, innovation capacity and organizational acceleration are among the effective factors for organizational development. Information technology capabilities play a significant role in this turbulent environment. Therefore, organizations that can use them in terms of knowledge acquisition, storage and transfer can be the next priority of organizations. The high growth of innovation capacity and organizational acceleration are among the key factors for improving organizational progress. Technology and innovation capacity are among the factors that have a great influence on the quantity and quality of organizational acceleration.

This study intends to answer the question of whether there is a significant relationship between information technology capabilities and organizational performance and acceleration with the moderating role of innovation capacity.

## RESEARCH BACKGROUND

Akbari et al. (2019) studied the role of organizational capabilities in reducing technology risks and improving the market performance of knowledge-based companies by mediating technology intelligence for more efficient competition by providing a theoretical model based on research and emphasizing information and knowledge of knowledge-based companies. It also explores the development of new products and services. Torabzadeh et al. (2018) conducted a study to identify the organizational success and failure factors affecting research and management of information technology organizations in knowledge-based companies in Iran. Success factors cause the success and improvement of research and technology management, and failure factors hinder the success and improvement of research and technology management. Naghizadfar (2017) studied the effect of ICT capabilities through organizational learning positively affecting organizational performance.

On the other hand, ICT skills do not affect organizational performance through the ability to absorb knowledge. Meanwhile, Kashaninejad and Haghshenas (2016) studied the effect of ICT capabilities on organizational performance with the mediating role of organizational agility in Tejarat Bank branches in the southwestern region of Tehran. By applying and strengthening ICT capabilities, improving organizational performance while increasing organizational agility. Soraki (2016) investigates the impact of ICT on improving organizational performance (a case study of Social Security Organization of Greater Tehran Branches). Ranking of respondents' statements regarding the influence of ICT on each of the performance dimensions of Tehran branches of Social Security Organization, respectively; organizational Support, motivation, work recognition, environmental sustainability, performance feedback, power, and decision credibility. The test results show a significant effect. Taghva et al. (2015) studied using ICT on organizational performance and competitive advantage. The data obtained from the questionnaire around the research hypotheses were tested in a model and showed that IT factors are safe and affect organizational performance and competitive advantage. Feyz et al. (2014) investigate the effect of ICT on organizational acceleration in small and medium enterprises. ICT had no positive and significant effect on organizational acceleration and the dimensions of new job creation, organizational culture in processes, risk-taking, self-renewal, and aggressive competition in small and medium enterprises in Semnan industrial town. However, in terms of organizational culture, it was influential in products and services and pioneering. Hajizadeh et al. (2013) conducted a study on the effect of ICT on organizational acceleration skills of trainers in technical and professional centers of Mazandaran province. A descriptive survey data analysis showed the effect of organizational acceleration skills (management skills, technical skills, and personal skills) of trainers in technical and professional centers. The most effective were: technical skills with a grade point average (3.89), management skills with an average (3.86), and personal skills (3.45), respectively.

Liang (2019) studied the factors influencing the emergence of innovation, performance, and entrepreneurship. The way to improve the company's innovation capacity is declining, and organizational innovation is inefficient. In these structures, innovation, performance, and organizational entrepreneurship provide a more balanced adaptation to changing environmental conditions and the possibility of flexibility and freedom of action for employees of business units. This creates an excellent ground for forming innovation, performance, and organizational entrepreneurship in the company. Ravichandran<sup>4</sup> (2018) conducted a study titled Investigating the Relationship between Information Technology Skills, Innovation Capacity, and Organizational Agility. Organizational innovation is also positively related to organizational agility, where companies with higher innovativeness can better leverage their digital operating systems to increase agility. Organizational agility has a positive effect on firm performance. Sungo et al. (2018) employed the document mining method to investigate information technology and performance and find a solution to improve performance improvement based on performance improvement through IT. Yang(2017) conducted a study entitled The Study of the Impact of Information and Communication Technology and Innovation on Organizational Entrepreneurship. The absorptive capacity through organizational entrepreneurship affects innovation performance, but its direct effect in

acquisition and transfer on innovation performance is not confirmed. In other words, increasing ICT and innovation in the firm leads to organizational entrepreneurship, but it does not directly increase innovative performance.

The study by Meyer et al. (2017) and Wang et al. (2016) showed that ICT capabilities affect the performance of companies. Among the three external variables, namely user experience, organizational support, and information quality, user experience on employees' mental perceptions of the usability and usefulness of information and communication technology were more significant than the innovation and organizational performance. Roberts et al. (2016) described the mediating role of organizational structure to show the ICT impact on Organizational Performance. The positive and significant coefficient of the effect is 4.69, ICT on organizational structure is 6.82, and organizational structure on performance is 5.80. As a result, it is possible to educate employees in ICT and change the structure of jobs by installing up-to-date equipment and software, improving performance, sharing knowledge to facilitate organizational learning, and providing acceleration of administrative processes reduced workload.

## RESEARCH HYPOTHESES

Based on previous studies and the extension of Hult et al (208) studies, following hypotheses are presented:

1. IT capabilities have a significant relationship with organizational acceleration.
2. Innovation capacity has significant relationship with organizational acceleration.
3. Organizational acceleration has significant relationship with organizational performance.
4. Innovation capacity in the relationship between IT capabilities has a moderating role in organizational acceleration.

## RESEARCH METHODOLOGY

This research is an applied and descriptive survey. The study's statistical population includes all employees of Sina, Parsian, and Mellat banks in Mazandaran province, whose number is 1400 people. In order to determine the sample size based on Cochran's limited formula, the number of samples in this study was set at 302, which were selected by simple random sampling. For collecting the baseline data, the type of method in the field, and the primary data collection instrument was the standard Likert questionnaire by Ravichandran (2018). IT capabilities are taken from questions (1-7), organizational acceleration from questions (8-13), organizational performance from questions (14-18), and innovativeness from questions (19-23). The library method was used to collect secondary data. Both content and formal methods were used to validate the questionnaire. Cronbach's alpha was used to analyze its reliability, which yielded overall reliability of 0.906. The structural equation modeling was conducted using the smart PLS software to test the research hypotheses,

## RESEARCH RESULTS

### INVESTIGATION OF THE NORMALITY OF THE DISTRIBUTION OF THE RESEARCH VARIABLES

The Kolmogorov-Smirnov test was used to examine the normality of the distribution of the research variables. In this test, the null hypothesis is rejected if the significance level of Kolmogorov-Smirnov statistic is less than 0.05. If the significance level is greater than 0.05, there is no reason to reject the null hypothesis (i.e., normality of the variables). The results of the test for normality of the research variables are presented in Table 1.

TABLE 1. Results related to the normality test of the distribution of variables

Agents	Statistics of Z. Kolmogorov-Smirnov	Significance level
IT capabilities	0.704	0.518
Organizational acceleration	0.772	0.590
Innovation capacity	0.808	0.490
Organizational Performance	0.560	0.597

As can be seen in Table 1, since the significance level of the Kolmogorov-Smirnov statistic is greater than 0.05 for all variables, there is no reason to reject the null hypothesis and all variables follow the normal distribution.

### ASSESSING THE FIT OF THE RESEARCH MEASUREMENT MODELS

Three criteria of index reliability, convergent validity and divergent validity are used to evaluate the fit of the measurement model.

#### FACTOR LOADING COEFFICIENTS

Figure 1 shows the values of the factor loadings of the research criteria.

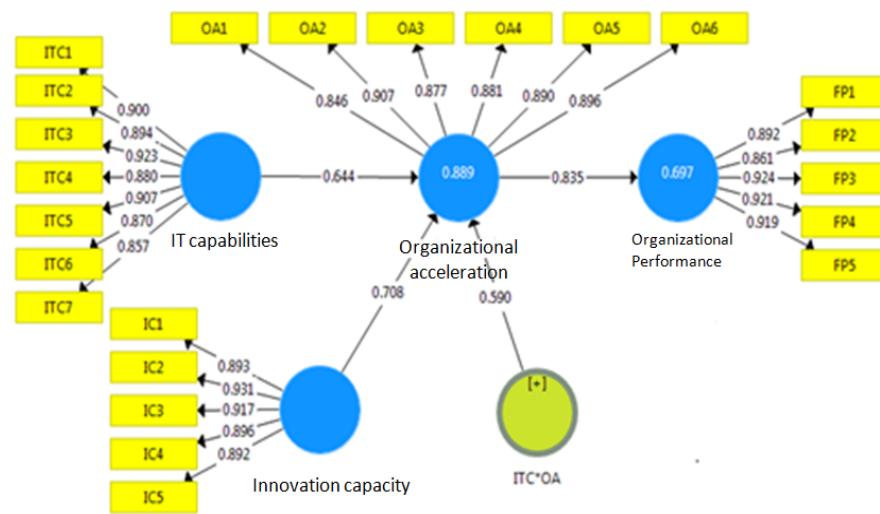


FIGURE 1. Research hypotheses for estimating standard coefficients

Figure 1 shows the research model for estimating standard coefficients. As can be seen, in all model structures, the operating loads are greater than 0.4. Therefore, the reliability of the measurement models is acceptable.

#### CRONBACH'S ALPHA, COMPOSITE RELIABILITY AND CONVERGENT VALIDITY

Convergent validity is another criterion used to fit measurement models in structural equation modeling. Convergent validity occurs when the value of all standardized factor loadings with respect to each of the measurement variables and also the value of the AVE index with respect to each of the latent variables is greater than 0.5.

TABLE 2. Cronbach's alpha standard report, combined reliability and convergent validity

The hidden structure of the first order	Cronbach's alpha ( $\alpha \geq 0/7$ )	combined reliability ( $CR \geq 0/7$ )	Average variance extraction ( $AVE \geq 0/5$ )
Organizational acceleration	0.943	0.955	0.780
Innovation capacity	0.946	0.958	0.821
Organizational Performance	0.944	0.957	0.817
IT capabilities	0.956	0.964	0.793

Considering Cronbach's alpha values, convergent validity of measurement models is also desirable. Moreover, if there are second and higher order hidden variables in the research model, manual calculation is used to calculate the combined reliability (CR) and average variance extraction (AVE). Although the Smart PLS software calculates the AVE and CR values for second and higher order structures in its output, these values may not be calculated correctly.

#### DIVERGENT VALIDITY

Divergent validity is the third criterion to check the fit of measurement models, which includes two aspects:

According to the figures in table 3, (correlation between structures and AVE root) and since the values of AVE root (figures in the original diameter) are higher than their lower values, so the divergent validity of the structure is confirmed by the Fornell-Locker criterion.

TABLE 3. Fornell-Locker matrix

Variable	Organizational acceleration	Innovation capacity	Organizational Performance	IT capabilities
Organizational acceleration	<b>0.883</b>			
Innovation capacity	0.866	<b>0.906</b>		
Organizational Performance	0.835	0.852	<b>0.904</b>	
IT capabilities	0.824	0.823	0.811	<b>0.891</b>

### CHECKING THE FIT OF THE STRUCTURAL MODEL

The fit of the structural model can be checked using the significance coefficients Z (t-value),  $R^2$  criterion and  $Q^2$  criterion.

#### COEFFICIENT OF DETERMINATION ( $R^2$ )

$R^2$  is a criterion used to connect the measurement part with the structural part of structural equation modeling and shows the effect that an exogenous variable has on an endogenous variable, and its value is zero for the exogenous variable. The value of  $R^2$  of the endogenous structures of a model, if higher, indicates a better fit of the model. Chin (1998) introduces three values of 0.19, 0.33 and 0.67 as the criterion values for weak, medium and strong values of  $R^2$  respectively. Therefore, weak, medium and strong are defined as the criterion values for weak, medium and strong values of  $R^2$  respectively.

TABLE 4. The values of  $R^2$  (R Squares)

Row	Organizational Performance	Organizational acceleration
1	0.697	0.889

As can be seen from Table 4, all values of  $R^2$  show a strong fit of the structural model.

#### PREDICTIVE POWER FACTOR ( $Q^2$ )

The predictive power determines the model. Models that have a suitable structural partial fit should be able to predict the indices related to the endogenous structures of the model. Hensler et al. set three values of 0.02, 0.15, and 0.35 for the intensity of predictive power, indicating the intensity of weak, moderate, and strong predictive power, respectively. The value of  $Q^2$  is shown in table 5, which confirms the strong predictive power of the model and the proper fit of the structural model.

TABLE 5. The values of  $Q^2$

	Innovation capacity	Organizational acceleration
$Q^2$	0.623	0.749

Investigation of research hypotheses in (t-value) significant



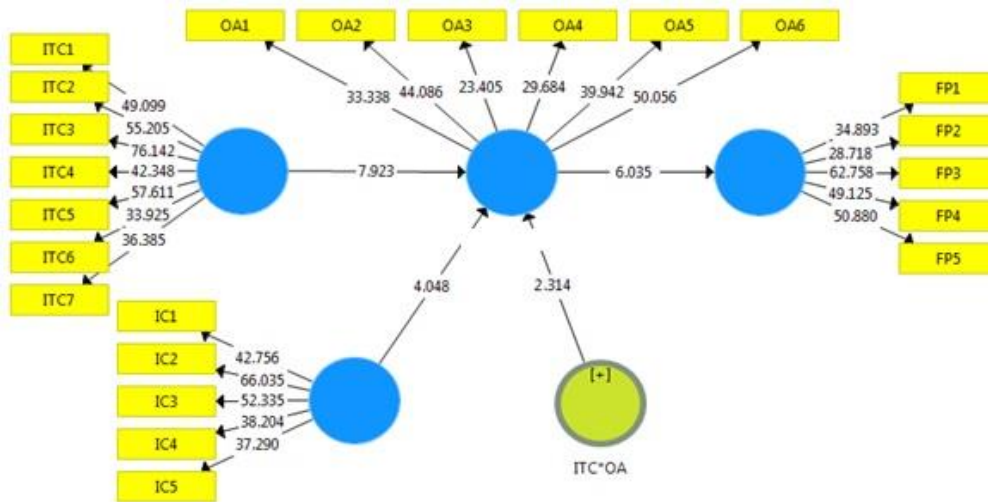


FIGURE 2. Research hypothesis in (t-value) significance

Figure 2 shows the research model in (t-value) significant mode. This model actually tests all measurement equations (factor load) and structural equations with a t-statistic. According to this model, the path coefficients and the operating load are significant at 95% confidence level. If the t-statistic is outside the range of -1.96 to +1.96.

## RESEARCH HYPOTHESES TESTING

Hypothesis 1: Information technology capabilities have a significant relationship with organizational acceleration.

H<sub>0</sub>: IT capabilities have no significant relationship with organizational acceleration.

H<sub>1</sub>: IT capabilities have a significant relationship with organizational acceleration.

Table 6. The First Hypothesis of It Capabilities In Organizational Acceleration

Variable	Route factor	P-VALUE	significant	hypothesis result
IT capabilities on organizational acceleration	0.644	0.000	7.923	Acceptable

Interpretation: based on the results of table 6, the relationship between information technology capabilities and organizational acceleration has a value of  $t = 7.923$ . The value of  $t$  for this parameter (according to the 0.05 error rule in the rejection zone of zero for values above 1.96 per model parameter) is calculated to be greater than 1.96. Therefore, the researcher's claim that informational capabilities have a significant relationship with organizational acceleration is confirmed.

Hypothesis 2: Innovation capacity has a significant relationship with organizational acceleration.

H<sub>0</sub>: Innovation capacity has no significant relationship with organizational acceleration.

H<sub>1</sub>: Innovation capacity has a significant relationship with organizational acceleration.

TABLE 7. The second hypothesis of innovation capacity on organizational acceleration

Variable	Route factor	P-VALUE	significant	hypothesis result
Innovation capacity	0.708	0.000	4.048	Acceptable

Interpretation: based on the results of table 7, the relationship between innovation capacity and organizational acceleration has a value of  $t = 4.048$ . The value of  $t$  for this parameter (according to the 0.05 error rule in the rejection zone of zero for values above 1.96 per model parameter) is calculated to be greater than 1.96. Therefore, the researcher's claim that innovativeness has a significant relationship with organizational acceleration is confirmed.

Hypothesis 3: Organizational acceleration has a significant relationship with organizational performance.

H<sub>0</sub>: Organizational acceleration has no significant relationship with organizational performance.

H<sub>1</sub>: Organizational acceleration has a significant relationship with organizational performance.

TABLE 8. The second hypothesis of innovation capacity on organizational acceleration

Variable	Route factor	P-VALUE	significant	hypothesis result
Organizational acceleration	<b>0.835</b>	0.000	<b>6.035</b>	Acceptable

Interpretation: based on the results of table 8, the relationship between organizational acceleration and organizational performance has a value of  $t = 6.035$ . The value of  $t$  for this parameter (according to the 0.05 error rule in the rejection zone of zero for values above 1.96 per model parameter) is calculated to be greater than 1.96. Therefore, the researcher's claim that the capacity for innovation has a significant relationship with organizational acceleration is confirmed.

Hypothesis 4: Innovation capacity has a moderating role in the relationship between information technology capabilities and organizational acceleration. The value of the coefficient of determination before entering the moderator variable for the variable of information technology capabilities on organizational acceleration was equal to 0.64 and with entering the moderator variable, this value is 0.59. According to the formula introduced by (Hensler and Fasot, 2010), it is possible to estimate the effect of the moderator variable on the effect of the two variables on the relationship between information technology capabilities and organizational acceleration. When the value of the square root of  $f$  is in the range of 0.02 to 0.15, the effect of the adjustment variable is weak. If this value is between 0.15 and 0.35, we can say that it had a moderate effect, and if this value is higher than 0.35, we can say that the moderating variables had a strong and high effect on the relationship between the two variables. The value of the square root of  $f$  for the IT capabilities variable was equal to 0.35 and this shows that the moderator variable was able to set this relationship strong and high.

All the final results of the research hypotheses test are available in table 9:

TABLE 9. Final results of testing research hypothesis

Hypothesis	Route	Result
1	IT capabilities have a significant relationship with organizational acceleration .	Acceptable
2	Innovation capacity has a significant relationship with organizational acceleration .	Acceptable
3	Organizational acceleration has a significant relationship with organizational performance .	Acceptable
4	Innovation capacity in the relationship between information technology capabilities has a moderating role in organizational acceleration .	Acceptable

## DISCUSSION AND CONCLUSION

This article aims to explain the effect of information technology capabilities and organizational acceleration on performance with the role of innovation capacity moderator. (Case study: banking industry of Mazandaran province of Iran). The results showed that IT capabilities and organizational acceleration significantly affect performance with a moderating role of innovation capacity. The study of information technology capabilities on organizational acceleration has a significant relationship. It was found that the results of this hypothesis are consistent with the findings of previous research by Akbari et al. (2019), Soraki (2015), Liang (2019) and Wang et al. (2016). According to the field and library results of this study regarding the interpretation of this hypothesis, it can be stated that in order to minimize human errors in the information processing network of the organization, information and communication technology can be used in an organization. This leads to accelerating customer service and more importantly improving organizational performance and the use of information and communication technology leads to organizational entrepreneurship in organizations.

In the study of innovation capacity, there is a significant relationship between organizational acceleration. It was found that the results of the investigation of this hypothesis are consistent with the findings of previous studies by Torabzadeh et al. (2018), Taghva et al. (2015), Songo et al. (2018) and Yang (2017). According to the field and library results of this study to interpret this hypothesis, innovation can be considered as the key to the life of an organization. According to experts, most organizations consider innovation as a competitive advantage and innovation management is undeniable. There are different views that some organizations have the discussion about innovation management within the organization and others consider the importance of this discussion extra-organizational. The emergence of the need for inter-organizational interactions in this area and the subsequent creation of organizations with different characteristics with the aim of laying the foundation for inter-organizational interactions are the result of an extra-organizational view of innovation management to identify, grow and develop new ideas.

In the study of organizational acceleration, there is a significant relationship between organizational performances. It was found that the results of the study on this hypothesis are consistent with the findings of previous research conducted by Naghi Zadfar (2017), Hajizadeh et al. (2013), Ravichandran (2018) and Roberts et al. (2016). According to the field and library findings of this study regarding the interpretation of this hypothesis, it can be said that the importance of organizational entrepreneurship and the effective role of information and communication technology to achieve entrepreneurial goals in today's organizations. Due to its profound influence, IT has been able to play an undeniable role in most sectors of the global economy from the moment it was created and introduced. Information and communication technology can help them move closer to their goals by meeting the information needs of any organization.

Moderation of innovation capacity in the relationship between information technology capabilities on organizational acceleration has a moderating role. It was found that the results of the study on this hypothesis are consistent with the findings of previous research by Kashaninejad and Haghshenas (2015), Feyz et al. (2014), Ravichandran (2018) and Mayer et al. (2017). Based on the field and library findings of this study regarding the interpretation of this hypothesis, it can be said that organizations can remain a stable organization and also exert influence. In general, by creating a specific structure, the level of innovation can be improved to improve the conditions of enterprises, especially during the embargo period, and to implement the capabilities of information technology and organizational acceleration, the use of innovation is one of the most important components that organizations should focus on, and in this case, the role of information technology that supports creativity and innovation is mentioned as one of the most important factors. In this context, it is suggested that in order to improve performance, efforts should be made to train employees in the field of modern information technology. Considering the fact that information technology has a positive and significant effect on the organizational structure, it is suggested to the management of Sina, Parsian and Mellat banks in Mazandaran province to change the tendency of physical structure into virtual management by using information technology to enable work independent of time and place. Through information technology and designing information systems that can replace part of the structure, knowledge sharing platforms are created to facilitate organizational learning. To create a platform to facilitate and support organizational acceleration of basic and applied research related to information and communication technology, focusing on organizational priorities and needs to make the most of existing facilities. In order to strengthen the foundations of the tendency towards organizational acceleration in organizations, rules and regulations and barriers to communication and information sharing should be reduced to the lowest level, and professionals should be given greater freedom of action through the use of known and active models. Considering the importance of these two important variables, innovation and initiative against turbulence and conditions, the risk taking of knowledgeable managers should be increased to meet the different and diverse needs of customers so that the current situation can be used effectively.

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