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EFFECTS OF TOP MANAGEMENT SUPPORT, TECHNOLOGICAL SKILLS, AND CAPABILITIES ON ENTREPRENEURSHIP AND ORGANIZATIONAL PERFORMANCE

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ABSTRACT

This study focused on the effect of top management support, technological skills and capabilities on entrepreneurship and organizational performance. For this purpose, 248 employees of the software developer companies participated in this study. Participants were asked to fill the questionnaires of top management support, technological skills, technological distinctive competency, absorptive capacity, organizational entrepreneurship, and organizational performance. Data were analyzed by SEM using the software LISREL. The results showed that top management support had a significant positive effect on absorptive capacity and technological skill, while top management support had no significant effect on technological distinctive competency. Technological skill and absorptive capacity had a significant positive effect on technological distinctive competency. Technological distinctive competency, technological skill, and absorptive capacity had a significant positive effect on organizational entrepreneurship. Organizational entrepreneurship had a direct, significant and positive effect on organizational performance. Top management support had an indirect, significant and positive effect on organizational entrepreneurship and organizational performance. Absorptive capacity, technological distinctive competency, and technological skills had an indirect, significant and positive effect on organizational performance. In conclusion, the findings emphasize the role of top management support, technological skills, technological distinctive competency and absorptive capacity on entrepreneurship and organizational performance.

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1. INTRODUCTION

The main topic of organizational analysis is performance. Performance and its significance in achieving goals, as well as factors that can influence efficiency and effectiveness of performance are

discussed in most public and private organizations (Beygi & Fotros, 2009). Given the significance of performance in achieving organizational goals, it is essential to evaluate organizational performance accurately and identify and develop the factors which are effective in improvement and effectiveness of performance (Noruzy et al., 2013).

Entrepreneurship has been an important scientific topic since the late 20th century, especially at the startup stage (Koochi and Feizbakhsh, 2018). Currently, creative and innovative entrepreneurs worldwide have been a source of great developments in various fields of industry, education, services, etc. (Badri et al., 2006, Nakhaei et al., 2018). Entrepreneurial skills are vital for any type and size of organizations (Chrisman et al., 2003; Drucker, 2014). Thompson (1999) believes that entrepreneurial skills are essential requirements of all organizations (public, private, voluntary, etc.) in any size (large, medium and small). Organizational entrepreneurship as one of the mechanisms and measures of progress and survival of current organizations has attracted the attention of many researchers and managers (Zahra, 1992, 2012). The output of entrepreneurship is the increased competitiveness and flexibility. Entrepreneurship has its own requirements. The main reason that organizations seek entrepreneurship is that they require growth, development and competitive advantage for survival and those are achieved by entrepreneurship (Floid & Wooldridg, 1999; Wales et al., 2011). Modern organizations require great changes and high flexibility, which are achieved by entrepreneurship (Drucker, 2014; Van Doorn et al, 2015). Studies have shown that organizational entrepreneurship has an effect on organizational performance (Bojica & Fuentes, 2011; Martín-Rojas et al, 2011; Garcia-Morales, 2014). Now, the question is what entrepreneurial mechanisms of the organization are and how entrepreneurial skills are fostered; what factors facilitate the promotion of these capabilities. Accordingly, this study evaluates the effect of top management support, capabilities and technological skills on entrepreneurship and organizational performance.

Currently, technology could be considered as one of the most worthy assets of organizations to increase productivity and growth (Zahra & Kirchoff, 2005). Various advances in information technology (IT) capabilities have evolved the industry over the past decade. Adoption and implementation of IT impose distinct competitiveness on the organization (Liu et al, 2013). Access to comprehensive information and application of IT well-timed possibly improve inspiration and creativity and prevent resource waste, unnecessary duplications and, above all, useless decision-making (Janvier-James, 2012; Samadi et al., 2014). Therefore, recent studies have been interested in how firms invest their IT research to reach a competitive advantage (Huang, 2011).

Literature has highlighted the role of skills, capabilities, and competencies associated with technology as well as acquisition and application of knowledge (i.e., absorptive capacity) due to their important role in business performance of organizations (Lee et al., 2001; Martín-Rojas, 2011; Garcia-Morales et al, 2014). However, few studies have examined the effect of top management support of technology on the improvement of these technological skills, competencies, and capabilities. Moreover, previous studies have not addressed the effect of technological skills and capabilities as well as absorptive capacity on important organizational variables such as organizational entrepreneurship which is crucial to discover new business opportunities for improving organizational performance (Hayton, 2005; Garcia-Morales et al, 2014).

Technological skill is defined as specific technique of the organization and scientific

understanding of employees (Leonard-Barton, 1992), while technological distinctive competencies indicate ability or expertise of the organization to use scientific and technical knowledge through a set of processes and procedures for developing and improving products and processes (Real, Leal & Roldán, 2006). Effect of technological skills, technological distinctive competencies and absorptive capacity on entrepreneurship has not been addressed in previous studies. Entrepreneurship is a process in which individuals undertake new activities within the organization and tend to separate from normal processes to achieve new opportunities (Zampetakis & Moustakis, 2010). Studies show that technological skills, technological distinctive competencies, and absorptive capacity have a positive effect on entrepreneurship (Zahra et al, 1999; Zahra et al, 2009; Garcia-Morales et al, 2014).

Absorptive capacity refers to the ability of enterprises to recognize, absorb and use new values and external information for commercial purposes (Cohen & Levinthal, 1990; Garcia-Morales et al, 2014). Absorptive capacity is widely used in the organization to review innovation process and examine the effect of organizational learning on competitive advantage. In fact, absorptive capacity is a phenomenon that helps people learn and increases their ability to absorb information simultaneously (Garcia-Morales et al, 2014).

Zahra and George (2002) identified four dimensions of absorptive capacity, including acquisition, absorption, conversion, and application of knowledge. Acquisition is defined as a capacity to recognize, understand and acquire external knowledge required for operations of an organization. Hamel (1991) considers the acquisition of new specialized knowledge as a stimulus for organizational collaboration.

According to Ghosh et al (2001), all technological variables require top management commitment to support technology development within the organization. Top management support refers to top executive managers and their assistants who are responsible for corporate policies (BolíVar-Ramos et al, 2012). In fact, top management support of technology is defined as a technological strategy to direct the organization to identify, acquire, develop and use technology in order to achieve competitive advantage (Lanctot & Swan, 2000). Positive perceptions of top management in relation to usefulness of technology lead to special managerial actions to absorb new technologies (Liang et al, 2007). In technological context, top management support refers to the degree to which top management recognizes the importance of technological functions and is involved in activities related to technological success (Garcia-Morales et al, 2014).

Effectiveness of top management support on the development of technological skills, technological distinctive competencies, and absorptive capacity is one of the main topics of discussion for organizations. Therefore, companies are always under pressure to develop new skills and competencies and require acquisition and discovery of new knowledge to survive competitive activities (Garcia-Morales et al, 2014; Huang, 2011). Top managers and directors are enthusiastic to improve and develop information system management. Although the problems with design and completion of a comprehensive, integrated information system for large corporations are primarily managerial rather than technical, little is known about the role of managers in developing information systems or participation of top management in development of this system (Doll, 1985).

Thus, top management support is one of the determinants in increasing levels of technological

skills, because top management is responsible for providing adequate resources for technological training to improve IT knowledge of employees (BolíVar-Ramos et al., 2012; Keramati et al., 2013). In addition, top management support influences the development of technological distinctive competencies. Thus, top management plays an important role in the support of innovation and technology development in dynamic and competitive environments (Huang, 2011).

Top management support is essential for enabling organizations to access, absorb and use knowledge for commercial purposes. For example, top management support influences the implementation of IT which in turn leads to improved knowledge base and thus facilitated knowledge sharing and absorption (Alavi & Leidner, 2001; Garcia-Morales et al, 2014; Gholami et al., 2013). This increased absorptive capacity, in turn, leads to technological distinctive competencies, because these competencies are rooted in organizational knowledge (Real et al, 2006).

The review of the empirical literature reveals that few studies have addressed the effect of top management support, technological skills and capabilities on entrepreneurship and organizational performance. Therefore, the main problem of the current study is the effect of top management support, technological skills, and capabilities on entrepreneurship and organizational performance.

2. CONCEPTUAL MODEL

According to theoretical literature, the conceptual model is illustrated in Figure 1. Hypotheses are developed based on the conceptual model, as follows:

- 1) Top management support is effective in technological skills.
- 2) Top management support is effective on technological distinctive competencies.
- 3) Top management support is effective in absorptive capacity.
- 4) Technological skill is effective on technological distinctive competencies.
- 5) Absorptive capacity is effective on technological distinctive competencies.
- 6) Technological skill is effective on entrepreneurship.
- 7) Technological distinctive competency is effective in entrepreneurship.
- 8) Absorptive capacity is effective in entrepreneurship.
- 9) Entrepreneurship is effective in organizational performance.

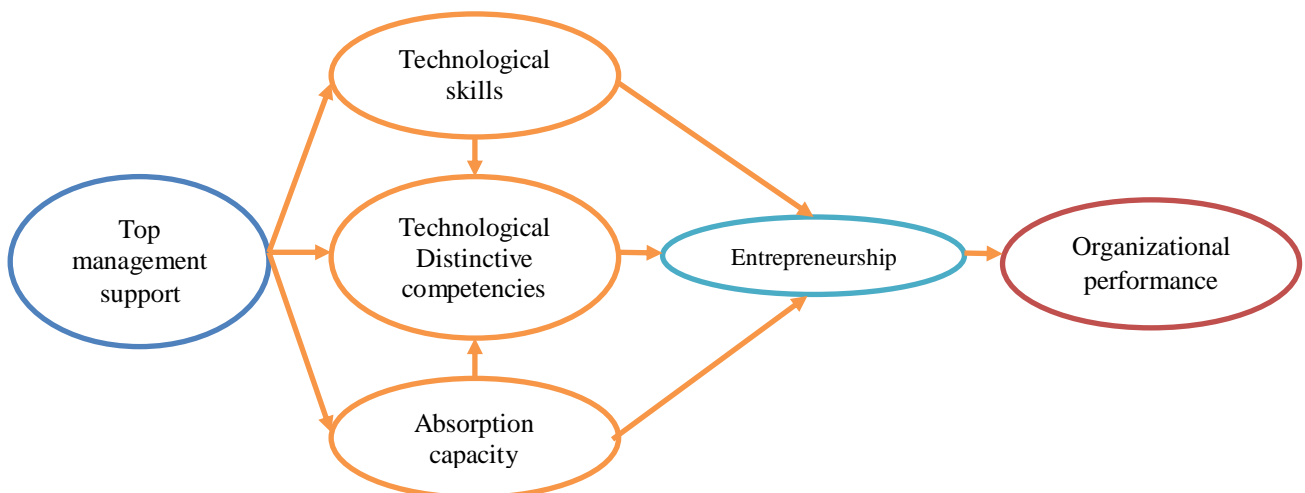


Figure 1: The study conceptual model.

3. MATERIALS AND METHODS

The methodology used for this study is descriptive (non-experimental) and correlational using structural equation modelling (SEM) because this study examines the relationships between variables through a causal model.

3.1 PARTICIPANTS

Participants included 300 employees of Iranian software developer companies. Questionnaires were distributed among the participants. Out of 300 questionnaires, 263 questionnaires were returned of which 15 questionnaires were excluded from the analysis because many of the questions were not responded. Finally, 248 questionnaires were included in the analysis.

3.2 DATA COLLECTION

Top management support: the questionnaires developed by Byrd and Davidson (2003) and Ray et al (2005) are used to measure top management support. Based on these two questionnaires, Garcia-Morales et al (2014) developed a 4-item questionnaire that was used for the current study. The questions were scored on a 5-point Likert scale from strongly disagree (1) to strongly agree (5).

Technological skills: the questionnaires developed by Ray et al (2005) and Byrd and Davidson (2003) are used to measure technological skills. Based on these two questionnaires, Garcia-Morales et al (2014) developed a 4-item questionnaire that was used for the current study. The questions were scored on a 5-point Likert scale from strongly disagree (1) to strongly agree (5).

Absorptive capacity: an 11-item questionnaire developed by Jiménez et al (2011) was used to measure absorptive capacity. The questions were scored on a 5-point Likert scale from strongly disagree (1) to strongly agree (5).

Technological distinctive competencies: a 6-item questionnaire developed by Real et al (2006) was used to measure technological distinctive competencies. The questions were scored on a 5-point Likert scale from strongly disagree (1) to strongly agree (5).

Entrepreneurship: a 16-item questionnaire developed by Knight (1997) and Zahra (1993) was used to measure entrepreneurship. The questions were scored on a 5-point Likert scale from strongly disagree (1) to strongly agree (5).

Organizational performance: a 5-item questionnaire developed by Murray and Kotabe (1999) and Zahra (1993) was used to measure organizational performance. The questions were scored on a 5-point Likert scale from strongly disagree (1) to strongly agree (5).

Table 1: fit indexes of confirmatory factor analysis

Index	RMSEA	GFI	AGFI	CFI	NFI	Cronbach's alpha
Top management support	0.043	0.96	0.94	1	0.99	0.87
Technological skill	0.039	0.97	0.96	1	1	0.79
Absorptive capacity	0.067	0.93	0.90	0.98	0.97	0.87
Technological distinctive competencies	0.052	0.95	0.92	0.99	0.99	0.76
Entrepreneurship	0.064	0.93	0.91	0.97	0.96	0.95
Organizational performance	0.047	0.96	0.95	1	1	0.91

The reliability and validity of the questionnaires were evaluated by Cronbach's alpha and factor

analysis, respectively. Table 1 reports the results of Cronbach's alpha and confirmatory factor analysis of variables. Obviously, all the indexes are well fitted to the variables.

3.3 DATA ANALYSIS

By calculating descriptive statistics, SEM was used to examine the causal relationship between variables. The software SPSS and LISREL were used for data analysis.

4. RESULTS

The analysis of causal models is based on the correlation matrix. Table 2 shows correlation matrix, mean and standard deviation of variables.

Table 2: correlation matrix of variables

Variables	1	2	3	4	5	6
1. Top management support	1					
2. Technological skill	0.43**	1				
3. Absorptive capacity	0.46**	0.65**	1			
4. Technological distinctive competencies	0.38**	0.60**	0.54**	1		
5. Entrepreneurship	0.63**	0.63**	0.53**	0.50**	1	
6. Organizational performance	0.46**	0.34**	0.38**	0.30**	0.58**	1
Mean	2.82	3.02	3.26	3.22	2.93	2.89
SD	1.02	0.89	0.73	0.72	0.87	0.99

* $P < 0.05$; ** $P < 0.01$

As shown in Table 2, there is a significant positive correlation between top management support and technological skill ($r = 0.43$), absorptive capacity ($r = 0.46$), technological distinctive competencies ($r = 0.38$), organizational entrepreneurship ($r = 0.63$) and organizational performance ($r = 0.46$). There is a significant positive correlation between technological skill and absorptive capacity ($r = 0.65$), technological distinctive competencies ($r = 0.63$) and organizational performance ($r = 0.34$). There is a significant positive correlation between absorptive capacity and technological distinctive competencies ($r = 0.54$), entrepreneurship ($r = 0.53$) and organizational performance ($r = 0.38$). There is a significant positive correlation between technological distinctive competencies and entrepreneurship ($r = 0.50$) and organizational performance ($r = 0.30$). There is a significant positive correlation between entrepreneurship and organizational performance ($r = 0.58$).

From the fitted model, it is found that top management support has a significant positive effect on absorptive capacity and technological skill, while top management support has no significant effect on technological distinctive competencies. Technological skill and absorptive capacity have a significant positive effect on technological distinctive competencies. Technological distinctive competency, technological skill, and absorptive capacity have a significant positive effect on entrepreneurship. Entrepreneurship has a direct, significant and positive effect on organizational performance.

The objective of this study is to determine the mediating role of technological skills, technological distinctive competencies and absorptive capacity in the relationship between top management support, organizational entrepreneurship and organizational performance by SEM. Table 3 lists values of direct effects, indirect effects, total effects, variance explained for the variables.

As shown in Table 3, the direct effect of entrepreneurship is significant and positive on organizational performance ($\beta = 0.61$). Direct effect of technological distinctive competencies ($\beta = 0.33$), technological skill ($\beta = 0.51$) and absorptive capacity ($\beta = 0.37$) is significant and positive on

organizational entrepreneurship. The direct effect of technological skill ($\beta = 0.48$) and absorptive capacity ($\beta = 0.42$) is significant and positive on technological distinctive competencies. The direct effect of top management support is not significant on technological distinctive competencies. The direct effect of top management support is significant and positive on absorptive capacity ($\beta = 0.49$) and technological skill ($\beta = 0.44$). The indirect effect of top management support is significant and positive on entrepreneurship and organizational performance. The indirect effect of absorptive capacity, technological distinctive competencies, and technological skills are positive and significant on organizational performance. In total, the model explains 37% variance in organizational performance, 51% variance in entrepreneurship, 43% variance in technological distinctive competencies, 24% absorptive capacity and 20% variance in technological skills. Fit indexes of the SEM are listed in Table 4.

Table 3: An estimate of the standardized values of direct effect, indirect effect, total effect, and variance explained of the model

Path	Direct effect	Indirect effect	Total effect	Variance explained
On organizational performance vie				
Entrepreneurship	0.61**	-	0.61**	37%
Technological distinctive competencies	-	0.20**	0.20**	
Absorptive capacity	-	0.31**	0.31**	
Technological skill	-	0.41**	0.41**	
Top management support	-	0.36**	0.36**	
On entrepreneurship vie				
Technological distinctive competencies	0.33**	-	0.33**	51%
Absorptive capacity	0.37**	0.14**	0.51**	
Technological skill	0.51**	0.16**	0.67**	
Top management support	-	0.86**	0.86**	
On technological distinctive competencies vie				
Absorptive capacity	0.42**	-	0.42**	43%
Technological skill	0.48**	-	0.48**	
Top management support	0.14	0.41**	0.55**	
On absorptive capacity vie				
Top management support	0.49**	-	0.49**	24%
On technological skill vie				
Top management support	0.44**	-	0.44**	20%

* P<0.05; ** P<0.01

Table 4: fit indexes of SEM

χ^2/df	RMSEA	GFI	AGFI	CFI	NNFI
1.86	0.059	0.94	0.92	0.99	0.98

As shown in Table 4, $\chi^2/df = 1.86$, GFI = 0.94, AGFI = 0.92 and RMSEA = 0.059, which are good. Thus, the model is well fitted.

5. DISCUSSION

The purpose of this study was to examine the effect of top management support, technological skills, and capabilities on entrepreneurship and organizational performance. SEM results showed that the suggested model is relatively well fitted to the data and can explain 37% variance in organizational performance, 51% variance in entrepreneurship, 43% variance in technological distinctive competencies, 24% absorptive capacity and 20% variance in technological skills.

SEM results showed that top management support has a significant and positive effect on technological skills. This is consistent with Byrd and Davidson (2003), Garcia-Morales et al (2007) and Garcia-Morales et al (2014). Top management provides adequate resources for training programs to improve technological expertise and thus technological skills of employees. Therefore, senior management support plays a deterministic role in increasing technological skills.

The results showed that the direct effect of top management support is not significant on technological distinctive competencies. Therefore, it can be concluded that top management support has no direct effect on technological distinctive competencies; instead, it promotes technological distinctive competencies through increasing absorptive capacity and improving skills of employees.

SEM results showed that top management support has a significant and positive effect on absorptive capacity. This finding is consistent with Camisón and Forés (2010) and Garcia-Morales et al (2014). Knowledge absorptive capacity will increase if top management supports the promotion of IT projects, allocate adequate funds to research and development in the field of technology, reconstructs work processes as leverage of technological opportunities within the organization, and facilitates technology transfer in the organization.

The results showed that technological skill has a significant and positive effect on technological distinctive competencies. This finding is consistent with Benitez et al (2010) and Garcia-Morales et al (2014). Technological distinctive competencies will increase in the organization by the very good performance of hardware and operating systems, optimal performance of employees in using business application, and skills of IT department in using programming languages.

SEM results showed that absorptive capacity has a significant and positive effect on technological distinctive competencies. This finding is consistent with Wood and Weigel (2011) and Garcia-Morales et al (2014). Absorptive capacity leads to technological distinctive competencies through acquisition and sharing of knowledge, because these competencies are rooted in corporate knowledge (Real et al, 2006). Zahra and George (2002) suggest that companies acquire, absorb, transform and exploit knowledge through absorptive capacity to create a dynamic organizational capability. These four dimensions enable companies to re-shape their resources, adapt to changing market conditions and achieve competitive advantage.

The results showed that technological skills a significant and positive effect on entrepreneurship. Therefore, the improvement of technological competencies and skills of employees improve entrepreneurship. This is consistent with Zahra et al (1999), Zahra et al (2009) and Garcia-Morales et al (2014). In line with this finding, Zahra and Kevin (2000) claim that technology is one of the key drivers to entrepreneurship and the key idea of change. These changes redefine business concepts, and design and apply new innovative systems.

The results showed that technological distinctive competencies have a significant and positive effect on entrepreneurship. This finding is consistent with Hussinger (2010) and Garcia-Morales et al (2014). Entrepreneurship will increase in an organization which is able to obtain information about status and progress of relevant sciences and technologies; produce advanced technological processes; absorb new technologies and beneficial innovations; attract and retain qualified scientific and technical personnel; control, generate or absorb key business technology; and launch programs for

development of domestic technology or technology absorptive competencies from research and development centers or suppliers and customers effectively.

SEM results showed that absorptive capacity has a significant and positive effect on entrepreneurship. This finding is consistent with Zahra et al (2009) and Garcia-Morales et al (2014). The organization can improve entrepreneurship by close personal interactions, relationships based on mutual trust and reciprocity, consistent management styles and cultures, organized meetings of departments to discuss about development and approaches, distribution of information among departments, capabilities required for ensuring the flow of knowledge within the organization and sharing of knowledge between departments, clear assignment of responsibilities regarding external knowledge, and capabilities required for discovering external knowledge.

The results showed that entrepreneurship has a significant and positive effect on organizational performance. This finding is consistent with Bojica and Fuentes (2011), Martín-Rojas et al (2011) and Garcia-Morales et al (2014). Organizational performance will be improved by new demands on existing products and services in current markets through advertising and marketing, expansion of current business lines, pursuit of new businesses in new industries related to recent activities, offering of new services and products to new markets, allocation of resources for development of new services and products, increased number of services and products in the market, emphasis on research and development and innovation, introduction of new services and products, managerial techniques and operational technologies, tendency to run high-risk projects, broad and bold actions to achieve goals, reorganization of departments to increase innovation, and flexible structure of the organization to increase innovation (Nazari-Shirkouhi and Keramati, 2017; Nazari-Shirkouhi et al., 2013). Therefore, entrepreneurship results from venture investments, the profitable establishment of the organization, changed strategies to take advantage of innovation and utilization of knowledge to expand profitability and success of organizations and improves organizational performance.

6. CONCLUSION

This study showed that top management support is effective in the development of technological skills, technological distinctive competencies and absorptive capacity through which it increases entrepreneurship and organizational performance. Therefore, top management influences entrepreneurship and organizational performance by providing adequate resources for technological training to improve IT knowledge of employees, using scientific and technical knowledge by developing and improving products and processes, and enabling the organization to access, absorb and utilize knowledge. This project addressed a sample of software developer companies; thus, it will be difficult to generalize findings. Moreover, findings are based on self-report data. It is recommended to use qualitative and hybrid methods in future studies to understand the factors which are effective in entrepreneurship and organizational performance.

7. DATAT AND MATERIAL AVAILABILITY

Relevant information regarding this study is available by requesting to the corresponding author.

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