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Article

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Digital Business

Provided in Cooperation with:

International Telecommunications Society (ITS)

Suggested Citation: Pashutan, Masume; Abdolvand, Neda; Harandi, Saeedeh Rajae (2022) : The impact of IT resources and strategic alignment on organizational performance: The moderating role of environmental uncertainty, Digital Business, ISSN 2666-9544, Elsevier, Amsterdam, Vol. 2, Iss. 2, pp. 1-10,
<https://doi.org/10.1016/j.digbus.2022.100026>

This Version is available at:

<https://hdl.handle.net/10419/337902>

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The impact of IT resources and strategic alignment on organizational performance: The moderating role of environmental uncertainty

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ARTICLE INFO

Keywords:

IT investment
IT management
Strategic alignment
Environmental uncertainty
Organizational performance

ABSTRACT

Today, organizations make significant investments in information technology (IT) as a strategic resource to achieve their goals. If these investments are managed properly, they can create value for the organization. However, companies face problems in evaluating IT investment plans to gain value from them and improve organizational performance, which can be attributed to different reasons such as environmental uncertainty. Therefore, this study used a resource-based view and evaluated the impact of IT investment, IT management as two important IT resources, and strategic alignment on organizational performance by considering the moderating role of environmental uncertainty as one of the most important challenges of companies in IT usage. The quantitative approach was used and the required data was gathered using two questionnaires (one for IT managers and one for executives). The questionnaires were collected randomly from 70 IT managers, and 70 CIOs, and CEOs of small and medium-sized IT organizations (SMEs). Then data was analyzed using Structural Equation Modeling through using PLS software. Based on the results, strategic alignment and IT management are effective on organizational performance. Besides, environmental uncertainty moderated these relationships. The results of the study will help managers to nurture IT resources in their company to develop their strategies based on their perceived level of environmental uncertainty.

1. Introduction

The pervasive growth of information technology (IT) in the world has inspired organizations to take advantages of new technologies such as mobile, cloud computing, big data, and social networking to survive (Taylor & Vithayathil, 2018). Therefore, investments in IT and other complementary activities are expected to increase (Velcu, 2008). If these investments are well managed, they can create value for organizations (Johnston & Zhang, 2018; Van Grembergen & De Haes, 2010). In spite of this, studies have shown that companies face difficulties in evaluating IT investment plans and gaining value from them, which can be attributed to various reasons, one of which is environmental uncertainty (Wang, Shi, Nevo, Li, & Chen, 2015). Prediction is not possible in uncertain circumstances and decisions in these circumstances will be accompanied by error (Chen & Chou, 2009; Chen, Mocker, Preston, & Teubner, 2010). Therefore, considering uncertainty as an effective factor in IT investment is an undeniable necessity (Sabherwal, Sabherwal, Havakhor, & Steelman, 2019; Wang et al., 2015).

It has been shown that with proper IT management, uncertainty in IT

implementation will be successfully addressed and errors will be corrected sooner, which leads to lower costs and higher quality of IT services. (Wang et al., 2015). The main purpose of IT management is creating value from technology. To achieve this goal, business and IT strategies must be aligned. Strategic alignment can increase organizational productivity (Ghonim, Khashaba, Al-Najaar, & Khashan, 2020; Slim et al., 2021; Yayla & Hu, 2012). In spite of this, the degree to which IT management strategies align with business strategies varies widely across companies (Gupta, Karimi, & Somers, 1997).

Previous studies indicated that valuable IT resources (e.g., Aral & Weill, 2007; Sabherwal et al., 2019), strategic business-IT alignment (Chau, Ngai, Gerow, & Thatcher, 2020; Ghonim et al., 2020; Ilmudeen, Bao, & Alharbi, 2019), and the Strong IT ability to respond to dynamic environments (e.g., Sabherwal et al., 2019) will lead to superior IT performance (Lin, Li, Luo, & Benitez, 2020; Wang et al., 2015). This is consistent with resource-based view (RBV) theory that claims IT resources are essential for performance improvement (Miyamoto, 2017). RBV provides a framework for gaining competitive advantage by using organizational resources and capabilities (Donnellan & Rutledge, 2019;

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Kamboj, Goyal, & Rahman, 2015). However, little effort has been made to investigate the relationship between different IT resources and the effects of these relationships on firm performance (Wang et al., 2015). Further, empirical research has been done in this area indicating that IT sources have contradictory impact on organizational performance. One reason for different results would be the different business environment of developed and developing countries, which limited the generalizability of IT research findings to similar contexts. Such conditions may affect how IT is used to increase organizational performance productivity (Melville, Kraemer, & Gurbaxani, 2004; Yayla & Hu, 2012).

According to Abbasi and Zamani-Miandashti (2013), Iranian organizations strive to keep growth in the information and communication technology (ICT). However, different problems related to ICT, including lack of appropriate technologies, infrastructure and explicit IT policies led organizations to implement their own master plan (Asemi, 2006). In spite of it, few studies have been done on the status of IT in Iran, which include various areas of technological advancement, IT related policies and strategies, and IT infrastructure.

In addition, although the direct impact of several IS resources/capabilities on firm performance have been identified in previous studies, the interrelationship between IT resources and capabilities have not been studied. Thus, it is unclear whether these IT interactions affect the commercial value of IT or not. Therefore, this question arises: How does IT management and IT investments, as the subsets of IT resources along with strategic alignment, affect firm performance despite environmental uncertainty in Iran developing country? To answer the proposed question and address the knowledge gap, this study was conducted to investigate the impact of three factors of IT investment, IT management and strategic alignment on organizational performance in a developing country of Iran. The moderating role of environmental uncertainty in these relationships is also examined.

This study considers both the direct role in which IT management and IT investment support organizational performance and the interactive role in which IT investment interacts with IT management to support competitive action and achieve improved performance interaction. Examining the relationship between IT resources and capabilities can help improve organizations' understanding of how to use resources to develop IT value and thus improve organizational performance. Besides, in response to the RBV literature request to consider the impact of the environment on the value of resources and capabilities (Bamel & Bamel, 2018) this study assumes that both roles are adjusted for the level of environmental dynamics. This study provides a systematic perspective on the role of environmental uncertainty in the value and capabilities of resources and strengthening studies in this field. Further, the results of the study will help managers to nurture IT resources in their company to develop their strategies based on their perceived degree of environmental uncertainty.

The rest of the study is as follows: After reviewing the literature, the proposed model and hypotheses are developed. Next, the research method, tools (i.e., two questionnaires were used for gathering data), the population of the study (all executives and IT managers of public and private small and medium-sized IT organizations (SMEs), the sample size, which was calculated through the 10 Times Rule, and the method of testing hypotheses (i.e., structural equation model (SEM)) were explained. Then, testing hypotheses and analyzing results were explained. Finally, in the conclusion and discussion part the implications of the study for research and practice were discussed and limitations and recommendations for future research were explained further.

2. Literature review

With the increasing use of information technology, investment in IT has become one of the important costs of organizations (Johnston & Zhang, 2018). IT investment is defined as the actual cost of resources for selected IT or IT-related projects with the expectation that the benefits of the costs will outweigh the value of the resources. IT investments are

expected to create value for any organizations in both private and public sectors (Ahmad & Arshad, 2014). It is an important factor that affects organizational performance by reducing fixed and variable costs in product design, development, and production (Dong, Karhade, Rai, & Xu, 2021; Luffman & Ben-Zvi, 2011). Shea, Dow, Chong, and Ngai (2019) studied the results of IT investment for organizations and indicated that the return on investment in IT for investors who invest in large companies increases with a low slope. Besides, the results confirmed the positive and significant business value in these companies. The same study by Gunawan and Serlyna (2018) in the banking sector indicated that if IT is used effectively and efficiently, the performance of organizations will increase. The study by Aral and Weill (2007) indicated a lack of correlation between overall IT investment and company performance.

Despite the large investment in IT, many businesses are failing in their IT implementations projects (Xin & Choudhary, 2019). Organizational strategy literature provides insight into how and why organizations may not achieve the desired results from technology usage. From this perspective, the RBV helps to clarify the theoretical mechanisms that may apply in a competitive technology environment (Khan, Zhang, & Salik, 2020). The RBV perspective states that companies can gain and maintain competitive advantage by utilizing their valuable resources and capabilities (Abdelkader & Abed, 2016; Miyamoto, 2017; Vom Brocke & Rosemann, 2014), which are useful for identifying and responding to market opportunities and threats (Abdelkader & Abed, 2016). These IT resources would not lead to performance improvement on their own and must be complemented with other resources and well managed to achieve performance advantages (Ricciardi, Zardini, & Rossignoli, 2018; Vom Brocke & Rosemann, 2014). Using strategic positioning theory and RBV perspectives, Kuettner and Schubert (2012) assessed the extent to which the share of value of IT investments can be sustained by competitive advantage. According to their results, all case studies report value share and process superiority status, but competitive advantages were only temporary.

The dynamic nature of the organization's business environment affects its performance (García-Sánchez, García-Morales, & Martín-Rojas, 2018). The business environment is characterized by several features, which includes the dynamics, complexity, and hostility that affect a company's results (Ahlstrom et al., 2020). Bryson (2018) believes that executives in complex dynamic environments often experience the highest level of uncertainty in decision making and therefore need to provide practical strategies to guide the organization toward achieving its objectives. Ma et al. (2021) used RBV theory and confirmed the positive impact of IT on the development of firm performance. In another study, Sabherwal et al. (2019) indicated that in dynamic and complex environments, strategic alignment increases the positive impact of IT investment on firm performance, while in stable environments, strategic alignment reflects the rigidity that reduces this effect.

Effective IT management will lead to the elimination of uncertainties in the implementation of IT and errors will be corrected sooner, which results in lower costs and higher quality of IT services (Wang et al., 2015). IT management refers to the effective use of IT that leads to value creation for the business and brings a competitive advantage to the organization (Maes, De Haes, & Van Grembergen, 2012; Wang et al., 2015). It includes the management of IT people and business-IT processes. IT management strategy is primarily related to the roles and structures of IT activities in the company (Ilmudeen & Bao, 2020; Shamekh, 2008). Wang, Peng, and Prybutok (2022) indicated that IT in interaction with business operations and leadership makes a significant difference in quality management and thus improves organizational performance. In another study by Wang et al. (2015) the heterogeneous role of IT resources in improving firm performance was studied. The results indicated that IT management and IT assets in interaction with each other will improve performance and this relationship is moderated by environmental uncertainty. In another study, Chen and Wu (2011) confirmed the significant impact of IT management on CIO performance.

The main goal of IT management is to create value from technology

that is achieved through strategic alignment (Ghonim et al., 2020; Slim et al., 2021). Ilmudeen and Bao (2020) indicated that IT and business strategic alignment to some extent induce the effect of IT management on performance. Strategic alignment is defined as the coordination between business strategy with IT strategy and infrastructure and organizational process with IT infrastructure and process. (Ilmudeen et al., 2019). Anamanjia and Maina (2022) indicated that that strategic alignment allows the organization to seize opportunities and is important in increasing organizational performance. Slim et al. (2021) and Charoensuk, Wongsurawat, and Khang (2014) also confirmed the positive impact of IT alignment on firm performance. In another study, Yayla and Hu (2012) indicated that in highly dynamic and competitive environments, there is a positive and significant relationship between strategic alignment and performance. Another by Liang, You, and Liu (2010) using RBV theory indicated that IT resources can improve the performance of an organization and this effect will be increased by considering the mediating role of organizational capabilities.

According to studies conducted in this area, IT resources have a contradictory effect on organizational performance. Besides, few studies have been done on the role of environmental uncertainty in the relationship between IT resources and firm performance. Given that the study of IT is complicated due to the continuous evolution of new technology tools, and thereby the different impact of IT resources and capabilities (i.e., IT investment, IT management, IT alignment) on organizational performance, this study aims to evaluate the effect of three factors of IT investment, IT management and strategic alignment on organizational performance considering the moderating role of environmental uncertainty.

3. Hypotheses development and structural model

The objective of this study is to evaluate the effect of three factors of IT investment, IT management and strategic alignment on organizational performance considering the moderating role of environmental uncertainty. Therefore, doing conceptual study and reviewing the research literature, a model including IT alignment, IT management, IT investment, and environmental uncertainty was developed (Fig. 1), and related hypotheses are described further.

3.1. IT investment

IT Investment is defined as the investment in basic equipment, programs, services, and technologies (Novianti & Fajar, 2019). Appropriate management of these investments will lead to value creation for the organization (Johnston & Zhang, 2018; Van Grembergen & De Haes, 2010). According to RBV, IT investment is explicitly included as a resource that IT strategic alignment can inherently help its leverage (Sabherwal et al., 2019). While IT investment is constantly increasing,

proving the true value of these investments remains a major concern. Therefore, evaluating an advantage of such investments is essential for a company (Huang, Ou, Chen, & Lin, 2006). Many studies have acknowledged the positive impact of IT investment on performance (Aral & Weill, 2007; Dangolani, 2011; Ghorbanzad & Beig, 2012; Keramati, Azadeh, Mehran-Gohar, & Afshari-Mofrad, 2012; Mahmoudsalehi, Feizi, Taqhavifard, & Vanani, 2019; Sabherwal et al., 2019; Sadeghimanesh & Samadi, 2014; Wang et al., 2015). Li and Ye (1999), however, did not indicate a significant relationship between IT investment and improving profitability and consequently the performance of the organization. Therefore, it is hypothesized that:

H1. IT investment will positively affect organizational performance.

3.2. IT management

IT management is the process of managing the IT infrastructure and resources needed to plan, develop, and deliver IT services and products to meet business needs (Alsalam, 2020). It refers to the effective use of IT that leads to value creation for the business and brings a competitive advantage to the organization (Maes et al., 2012; Wang et al., 2015). Organizations have different IT resources and capabilities that based on RBV are the potential sources of competitive advantage (Miyamoto, 2017), and their proper management will lead to improved performance (Vom Brocke & Rosemann, 2014). Previous studies have indicated that investing in IT may not be effective due to mismanagement (Nagm & Cece-Kecmanovic, 2009). There is evidence that IT management affects organizational performance (Chen & Wu, 2011; Wang et al., 2015). Therefore, it is hypothesized that:

H2. IT management will positively affect organizational performance

3.3. Interaction between IT management and IT investment

Despite the huge investment in IT, many businesses are failing in their IT implementation projects (Xin & Choudhary, 2019). Actually, the effective use of IT depends entirely on its good management. The senior management support for the successful implementation and use of IT has always been emphasized (Abu-Naser & Al Shobaki, 2017), and the role of management in creating a successful IT investment is evident in reviewing the company's performance (Bharadwaj, Bharadwaj, & Konsynski, 1999). According to Wang et al. (2015), the interaction between IT management and IT assets will improve performance and this relationship is moderated by environmental uncertainty. Thus, an organization needs to understand how to use its IT management ability to adjust its IT assets to improve organizational performance. Besides, Loukis and Sapounas (2004) indicated that the interaction of IT investment and IT management will increase the firm productivity. Therefore, it is hypothesized that:

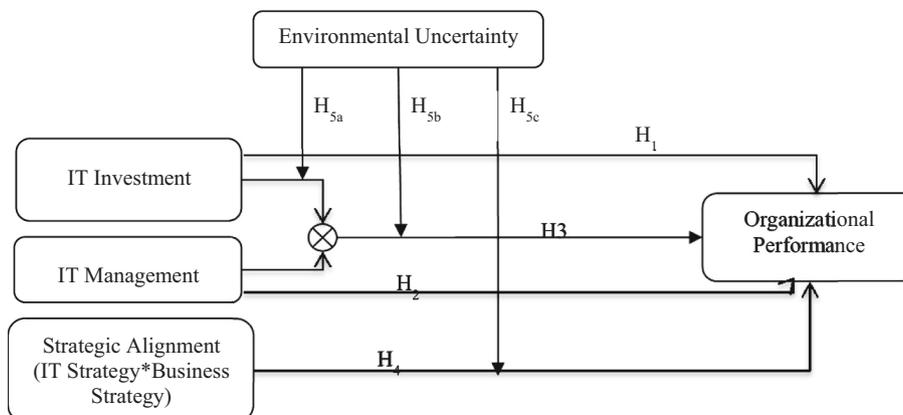


Fig. 1. Research model.

H3. The interaction of IT investment and IT management will positively affect organizational performance.

3.4. Strategic alignment

Strategic alignment means the degree of coordination between IT and business management and is generally defined as the relationship between IT and business (Ghonim et al., 2020; Ilmudeen et al., 2019; Alghazi, Li, Shen, & Fosso Wamba, 2017; Gerow, Grover, Thatcher, & Roth, 2014). IT provides an integrated organization in which all operations, units, and individuals focus on the organization's competitiveness (Ness, 2005; Chung, Rainer Jr, & Lewis, 2003). Strategic alignment can provide business value and prevent resource wastage by providing the platform needed for the optimal allocation of IT resources. (Wang et al., 2015). According to RBV, IT and business alignment can improve the performance (Ricciardi et al., 2018). Therefore, many experts believe that IT-business strategic alignment can be considered as a predictor of organizational performance. For example, the studies of Slim et al. (2021), Ghonim et al. (2020), Ilmudeen et al. (2019), Vom Brocke and Rosemann (2014), and Byrd, Lewis, and Bryan (2006) indicated that business-IT alignment leads to value creation for the organization and will improve organizational performance and organizational productivity. Therefore, it is hypothesized that:

H4. Strategic alignment will positively affect organizational performance.

3.5. Environmental uncertainty

Environmental uncertainty refers to unpredictable environmental conditions due to huge and rapid changes (Darvishmotevali, Altinay, & Köseoglu, 2020; Magerakis & Habib, 2021). It is one of the most important challenges of organizations, and many organizations use IT to reduce it. Prediction is not possible in conditions of uncertainty and decision making in this situation is associated with failure (Chen et al., 2010; Chen & Chou, 2009). Environmental uncertainty is known as a variable that can affect managerial performance (Magerakis & Habib, 2021). To overcome the problems caused by high environmental uncertainty, managers need reliable information (Dwirandra & Astika, 2020). RBV studies have uncovered resources and capabilities in the organization that link environmental strategy and organizational performance (e.g., Bamel & Bamel, 2018). For example, Christmann (2000) indicated that when a company implements "best practices" for environmental management, it will reduce costs and improve organizational performance.

It has been shown that IT management facilitates the relationship between the firm and its environment and helps organizations to identify future changes and select IT systems that can accommodate these changes (Wade & Hulland, 2004; Wang et al., 2015). Wang et al. (2015) indicated that IT management and IT assets in interaction with each other will improve performance and this relationship is moderated by environmental uncertainty. However, it is stated that the mere use of IT will not improve organizational performance. Thus, aligning IT and business processes will improve organizational performance (Ghonim et al., 2020; Slim et al., 2021; Yayla & Hu, 2012). Based on the RBV, it is argued that environmental uncertainty, which is examined in terms of dynamics and complexity, moderates the impact of IT strategic alignment on firm performance (Sabherwal et al., 2019). Therefore, it is hypothesized that:

H5a. Environmental uncertainty positively moderates the relationship between IT management and organizational performance.

H5b. Environmental uncertainty positively moderates the interactive effect of IT management and IT investment on organizational performance.

H5c. Environmental uncertainty positively moderates the relationship

between strategic alignment and organizational performance.

4. Methodology

4.1. Data collection and measure

This study was conducted in 2017 and the qualitative approach was used to examine the relationship between the studied variables. Two questionnaires were developed from the extant literature to conclude the picture of the subject under study (one questionnaire for IT managers and one for executive managers). The first part of questionnaires included the respondents' demographic information such as education, gender and work experience; the second part included 76 questions, 18 of which examines the business strategy, 9 of which examines organizational performance, 7 of which examines environmental uncertainty, 5 of which examines IT investment, 11 of which examines IT management, and 24 of which examines IT strategy based on 5-point likert scale ranging from strongly disagree to strongly agree. The questions of IT strategy and business strategy were used to measure the strategic alignment. Table 1 indicated the questions related to each construct. The experts' opinion was then used to assess the questionnaires' validity and their reliability was assessed using Cronbach's alpha, which was above 0.5 for all factors and indicated the appropriate reliability of the questionnaire (Cronbach, 1951). Table 1 indicates the questions related to each construct.

4.2. Statistical population and descriptive statistics

The statistical population of the study includes all executives and IT managers of public and private IT SMEs. The 10 Times Rule was used to calculate the minimum sample size. According to this rule, the maximum number of observable variables is multiplied by 10 (Cheah, Thurasamy, Memon, Chuah, & Ting, 2020), which results in 50. In this study, to be more confident, 70 managers were selected as a sample. The questionnaires were distributed in person and randomly among 70 IT managers, and 70 CIOs and CEOs of IT organizations in both public and private sectors.

In the business managers' questionnaire, 63% of respondents were men and 37% were women, and in the business managers' questionnaire 56% of respondents were men and 44% were women. Most of the respondents in both groups (IT managers and business managers) were between 30 and 40 years old. Besides, most of the respondents had a Master degree (73% of IT managers and 70% of business managers). In addition, in terms of work experience, most respondents had between 10 and 20 years of work experience (47% of both business managers and 44% of IT managers). A sample survey by type of industry shows that 20% of respondents work in the public sector. Table 2 indicates the characteristics of the respondents.

For this research, the path diagram of a structural equation model (SEM) was developed (Eliyana & Fauzan, 2018; Lyan, Defung, & Fakhroni, 2021). It is the most popular and reliable tool for constructive and reflective structures and small datasets (Hair, Sarstedt, Pieper, & Ringle, 2012). Path analysis was done using WarpPLS5 (Eliyana & Fauzan, 2018; Lyan et al., 2021; Machmud, 2020).

5. Testing hypotheses and analyzing results

The reliability of the constructs was assessed using the factor loading, composite reliability (CR), which should be between 0.6 and 0.7 (Shrestha, 2021). According to the conformity factor analysis, the loadings of six questions of business management questionnaire (2, 8, 9, 10, 17 and 18 of business strategy questions) and 9 questions of the IT managers questionnaire (questions 1 of IT management questions and, 24, 25 and 26 of IT strategy questions) were lower than 0.5, which were removed from the study and the analysis was repeated. Table 1 indicates the questions related to each construct. The average variance extracted

Table 1
Constructs and their measures.

Business managers' questions				
Construct	Question	Factor loading	Resource	
Business Strategy	1	Our organization has strong relationships with its suppliers.	0.60	(Charoensuk et al., 2014; Sabherwal & Chan, 2001)
	2	Our organization has strong relationships with its customers.	0.36	
	3	There is optimal coordination between all units, including services and products units.	0.71	
	4	In our organization, operational efficiency is continuously improved.	0.73	
	5	Our organization tends to analyze operations quantitatively and in the form of statistical reports.	0.50	
	6	In the organization, we need detailed and event-based information to make day-to-day operations decisions.	0.50	
	7	We comprehensively analyze every business opportunity or challenge we encounter.	0.71	
	8	There is a "tried and true" approach in the decision-making.	0.06	
	9	We prefer to take a conservative approach in decision making.	-0.06	
	10	The operations of organization are less risky than that of competitors.	0.015	
	11	The organization increases its capacity before competitors.	0.69	
	12	We are often the leader in introducing products and services to the market	0.66	
	13	Our organization quickly adopts innovations.	0.74	
	14	Performance metrics affect the long-term effectiveness of the business.	0.73	
	15	Budget allocation criteria are often a reflection of long-term considerations.	0.55	
	16	In our organization, gaining market share has a higher priority than profitability.	0.50	
	17	In our organization, gaining market share has a higher priority than cash flow.	0.29	
	18	We are constantly cutting prices to increase market share.	0.28	
Organizational Performance	1	The return on investment of the organization is better than other organizations (in the same industry).	0.71	(Wu, Straub, & Liang, 2015; Yayla & Hu, 2012)
	2	The return on equity of the organization is better than other organizations (in the same industry).	0.66	
	3	The return on assets of the organization is better than other organizations (in the same industry).	0.76	
	4	From the customers' point of view the quality of our organization's products/services is better than other organizations (in the same industry).	0.80	
	5	Customer satisfaction of our organization is higher than others (in the same industry).	0.89	
	6	The image of our organization in the minds of the audience is better than other organizations in the same industry	0.90	
	7	Productivity improvement in our organization is more than other organizations (in the same industry).	0.88	
	8	Customer service schedules in our organization are better than industry competitors.	0.78	
	9	The production cycle in our organization is better than the industry competitors.	0.78	
Environmental Uncertainty	1	In our industry, products and services become obsolete very quickly.	0.414	(Wang et al., 2015; Yayla & Hu, 2012)
	2	In our industry, production and service technologies are changing very fast.	0.786	
	3	We can predict what the next step of our competitor will be.	0.841	
	4	We can anticipate changes in demand for our products or services.	0.676	
	5	In our industry, there is a lot of variety in customers' shopping habits.	0.714	
	6	In our industry, there is a great variety in the nature of the organization's competition.	0.915	
	7	In this industry, organizations have various production lines.	0.772	
IT managers' questions				
Construct	Question	Factor loading	Resource	
IT Investment	1	What was the allocation of the total IT budget of the organization (internal and outsourcing) including computers, software, and data communications?	0.86	(Aral & Weill, 2007)
	2	How much of the allocated budget - mentioned in the previous question - has been spent on IT infrastructure as a basis for IT capability? (Infrastructure includes network, help desk, data centers and other applications).	0.69	
	3	How much has investing in IT reduced operating costs?	0.83	
	4	How much has investing in IT provided information on accounting, quality management, etc.?	0.05	
	5	To what extent has investing in IT increased or supported sales or market share?	0.52	
IT Management	1	In our organization, innovative opportunities for strategic use of IT are constantly examined.	0.32	(Chou, Wang, & Yang, 2015)
	2	In our organization, sufficient planning is done to introduce and use IT.	0.50	
	3	Our organization develops IS / IT plans in the form of systematic and formal processes.	0.60	
	4	In our organization, when developing IT, its impact on employee productivity and quality of work is estimated.	0.54	
	5	In our organization, when developing IS, it is examined how much it helps the employees and how much it causes the users to make faster decisions.	0.81	
	6	Operations and IT personnel frequently discuss organizational issues through formal and informal communication.	0.66	
	7	In our organization, information is shared between the operational and IT people of the organization and leads to a common understanding of the processes between decision makers and executives.	0.88	
IT Strategy	8	In our organization, the responsibilities and authority for IT management and development are clearly defined.	0.77	(Charoensuk et al., 2014; Sabherwal & Chan, 2001)
	9	We are confident that IT project proposals will be well evaluated.	0.82	
	10	In our organization, there is continuous monitoring of the performance of the IT unit.	0.78	
	11	The IS /IT unit is fully aware of its performance metrics in the organization.	0.78	
	1	Organization uses IT to improve the efficiency of daily operations.	0.50	
	2	IT helps to effectively coordinate units (such as marketing, production, etc.) and product lines.	0.50	
3	Get the statistics we need for day-to-day decisions using IT.	0.53		

(continued on next page)

Table 1 (continued)

Business managers' questions			
Construct	Question	Factor loading	Resource
	4 IT is used to gain the ability to partially analyze the current state of our business.	0.66	
	5 IT provides detailed information to support prudent decisions.	0.64	
	6 IT helps us with detailed analysis of important business decisions.	0.65	
	7 IT empowers the organization to communicate with suppliers.	0.66	
	8 IT enables the organization to communicate with customers.	0.63	
	9 IT facilitates negotiation with suppliers.	0.63	
	10 IT facilitates negotiation with customers.	0.70	
	11 IT helps to set price competitively.	0.78	
	12 IT facilitates the introduction of new products / services to the market.	0.52	
	13 IT allows us to examine changes in the organization's market share.	0.55	
	14 Through IT, it is possible to quickly set prices for the organization.	0.65	
	15 IT facilitates strategic business planning.	0.75	
	16 IT helps us to see what we might achieve if we chose each of the operational options.	0.61	
	17 IT is used to predict key performance indicators of a business.	0.75	
	18 Our organization is a leader and innovator in IS in its industry.	0.85	
	19 Our organization believes that it should be the first company in its industry to develop IT; even if not all of them are very profitable.	0.70	
	20 Our organization takes advantage of every IT opportunity quickly.	0.74	
	21 Our organization takes a confident and stable approach to IT development.	0.64	
	22 Our organization uses the new IS when the impact of this innovation on our industry have been proven.	0.50	(Chen et al., 2010)
	23 IT innovations are carefully reviewed and tested by the organization before being selected.	0.58	
	24 The organization has not defined the long-term IT goals.	-0.13	
	25 Our organization has not codified the IT strategy.	-0.12	
	26 The organization does not have a consistent pattern of behavior toward IT.	-0.23	

(AVE) was also used to measure the validity of constructs. This index should be above 0.5 (Al-Marouf & Al-Emran, 2018; Henseler, Ringle, & Sinkovics, 2009). According to Table 3, all values for AVE and CR are higher than the acceptance thresholds (i.e., 0.6) (Wetzels, Odekerken-Schröder, & Van Oppen, 2009) and are satisfactory.

To evaluate model fitness, the communality index (Henseler et al., 2009), and the redundancy index (R2) were used which were satisfactory in this research as illustrated in Table 3.

Hypotheses were tested by estimating the path coefficient and considering the *p*-value. Fig. 2 indicates the structural equation model of the research hypotheses and Table 4 summarizes the results of the research hypotheses. Based on the results of Table 4, strategic alignment (Path-Coefficient = 0.235, *P*-Value = 0.019), IT management (Path-Coefficient = 0.423, *P*-Value = 0.001) are positively effective on organizational performance. In addition, environmental uncertainty moderates the relationship between strategic alignment and organizational performance (Path-Coefficient = 0.244, *P*-Value = 0.015), the relationship between IT management and organizational performance (Path-Coefficient = 0.463, *P*-Value = 0.001). Besides, the interactive role of IT investment and IT management on organizational performance (Path-Coefficient = 0.281, *P*-Value = 0.006) was confirmed. The positive impact of environmental uncertainty on the interactive role of IT management and IT investment in organizational performance (Path-Coefficient = -0.495, *P*-Value = 0.001) was also confirmed; however, the negative path-coefficient represents the inverse relationship between two variables. Thus, hypotheses 2, 3, 4, 5a, 5b, 5c were accepted. But the effect of IT investment on organizational performance (Path-Coefficient = -0.100, *P*-Value = 0.195), so hypothesis 1 was rejected.

6. Discussion and conclusion

Many resources have been invested in IT and continue to be so. Much of this investment is based on the belief that returns will occur. Since starting any business and investing in any project requires a careful assessment of the potential benefits and losses, investing in IT in turn requires a careful assessment of its consequences for the organization. Therefore, this study tried to examine the impact of IT investment, IT management, and strategic alignment on organizational performance by considering the environmental uncertainty, as one of the most important

problems and challenges of companies that use IT. Relying on the RBV adopted in this study, the synergy resulting from the relationship between IT resources and the effect of this synergy on the performance of companies was confirmed. However, the impact of IT investment on organizational performance was rejected, which is consistent with the results of Li and Ye (1999), and inconsistent with the results of Sabherwal et al. (2019); Mahmoudsalehi et al. (2019); Wang et al. (2015), Sadeghimanesh and Samadi (2014), Ghorbanzad and Beig (2012), Keramati et al. (2012), Dangolani (2011) and Aral and Weill (2007). Besides, according to the results, the positive impact of IT management on organizational performance was confirmed, which is consistent with the results of Wang et al. (2015) and Chen and Wu (2011). This shows the important role of management in successful IT implementation. Therefore, the attention and support of senior management of the organization in its effectiveness will be very important. Therefore, it is recommended that the organization have well-defined policies and procedures to prevent performance management strategies from failing to achieve their desired goal.

In addition, the results demonstrated that the interactive relationship between IT investment and IT management has a positive effect on organizational performance, which is consistent with the results of Loukis and Sapounas (2004) that indicated the complementarity between IT investment and IT management concerning organizational productivity. Based on the results, mismanagement of IT will lead to the failure in IT investment. Therefore, combining IT investment with IT management will lead to higher organizational performance beyond the individual impact of each of these factors.

The results also confirmed the positive impact of strategic alignment on organizational performance, which is consistent with the findings of Slim et al. (2021), Ghonim et al. (2020), Ilmudeen et al. (2019), Vom Brocke and Rosemann (2014), and Byrd et al. (2006) studies. But due to the lack of common standards and infrastructure, as well as the lack of a strategic approach to design a coherent inter-organizational information system, every Iranian organization has tried to design and implement its own hardware and software in this field. Therefore, the potential for coordination between the systems used in organizations is ignored. As a result, in addition to large investments, new costs are needed to build integration. Therefore, given the tremendous impact of IT, organizations need to consider a clear and predetermined process for the successful

Table 2
Profile of the respondents.

		Executive managers	IT managers
Total Number		70	70
Gender	Men	63%	56%
	Women	37%	44%
Degree	Bachelor's degree	21%	17%
	Master degree	70%	73%
	Ph.D.	9%	10%
Years of work experience	1 to 10 years	34%	42%
	10 to 20	47%	44%
	20 to 30	15%	11%
	More than 30	4%	3%
Type of organization	Public	20%	20%

implementation of IT projects. In this regard, organizations should align their business and IT strategies and provide more capabilities to use IT resources. In addition, the effect of environmental uncertainty on the relationships defined in the hypotheses was confirmed, which is consistent with the results of Wang et al. (2015). Therefore, managers must pay attention to the external environment and analyze and interpret its features so that they can prepare appropriate plans for important future events.

6.1. Implication for research and practice

The study has several important implications for both research and management. This study examines the gap in the literature on the need to understand the impact of information technology resources on organizational performance in the developing country of Iran and contributes to knowledge in this field. In addition, this study, by adopting a contextual variable (environmental uncertainty), has responded to the recent call of the RBV literature for paying attention to the impact of the business environment on the value creation of resources and capabilities of the organization (Bamel & Bamel, 2018), and has tried to avoid the most criticism of the RBV, which is internal-oriented (organizational resources) in explaining the company's competitive advantage. Thus, this study contributes to literature in this field by assessing the impact of environmental uncertainty on resource and capabilities value, and reinforces studies conducted in this area. Further, this study considers both the direct and interactive role of IT investment and IT management on organizational performance. Besides, it proposes that both roles are moderated by the level of environmental dynamics.

This study confirmed that IT management, IT alignment and the interaction between IT investment and IT management can increase organizational performance. Therefore, managers must nurture IT resources in their company and execute those that are essential in making their competencies. According to RBV, sustainable competitive advantage is derived from a unique combination of important and scarce resources. A company's resources are used to enable it to develop strategies to improve the overall performance of the organization. Since these resources are scattered throughout the organization and there are various strategies for resource allocation, as these resources are distributed heterogeneously in the organization, how to invest in different types of IT assets will be important.

The negative impact of IT investment on organizational performance identified in this study does not mean that organizations do not invest in IT, as IT can increase organizational capabilities and thus leads to organizational performance improvement. Therefore, managers who want to use IT must focus on how to turn IT resources into useful capabilities. In addition, companies need to identify ways to build capabilities, rather than just investing in information technology. They also need to integrate resources to benefit from IT investments.

A dynamic environment is effective on the organizations' performance. Therefore, organizations should provide appropriate strategies

Table 3
Latent Variables' Measurement Results.

Factors	Cronbach's alpha	AVE	Composite reliability	R2
IT investment	0.709	0.674	0.935	-
IT management	0.955	0.548	0.824	-
Strategic alignment	0.918	0.504	0.959	-
IT investment * IT management	0.905	0.546	0.920	-
Organizational Performance	0.929	0.643	0.941	0.065
Environmental uncertainty	0.878	0.628	0.909	-

that align the company's operations with market conditions. In addition, in a dynamic environment, organizations need to develop and maintain IT management and focus more on maximizing the return on IT investment. Managers need to carefully understand and evaluate their external environment in the face of a diverse and competitive business environment. Dealing with environmental uncertainty requires special strategic management processes. This helps managers identify the types of uncertainty and its impact on the organization, resulting in better decision-making and the development of appropriate strategies to reduce potential risks and improve performance. It has been shown that IT management facilitates the relationship between the organization and its environment, and with effective IT management, environmental uncertainty in IT implementation will be successfully addressed and risks will be identified and eliminated faster. Furthermore, Organizations operating in uncertain environment should prioritize IT investment and make decisions based on it, because proper compliance can improve the return on IT investment.

A useful strategy in uncertain environments is decentralization, which allows organizations to effectively pursue a large number of opportunities. Decentralization is an organizational structure in which decision-making responsibilities are delegated to lower-level managers and employees. Decentralization gives employees more power and independence at lower levels to make decisions. The decentralized structure shows more control and a bottom-up flow of ideas, opinions and decisions. Under decentralization, all members can act more quickly to decide and solve problems and control the situation (Darvishmotevali, 2019). Decentralization offers several benefits to organizations that aim to have competitive strategies. Decentralization gives managers more independence and control over resources, enabling them to initiate and test more innovations. It is an important means of achieving effective differentiation and supports the process of realizing opportunities in various ways. When decentralization is high, managers have more freedom of action in customizing the process, state, and timing of realization, which improves the chances of success. This customization process also enables managers to consider the specific market opportunities and conditions.

6.2. Limitations and future research

Considering the uniqueness of IT strategies and organizational ideals in different countries, the results of this study may be restricted to a similar context. Therefore, it is suggested that in future studies in the field of information technology application and organizational performance, the context and conditions of each country be considered as a macro variable. Given that many internal and external factors are effective in IT investment and acquisition of its value, it is suggested that future studies examine the moderating role of other variables inside and outside the organization, including culture, the level of senior management support, etc.

In addition, Weiss, Thorogood, and Clark (2007) hypothesize that alignment occurs at three levels of technical resource, business enabler, and strategic weapon, which seems that Iranian organizations are at the

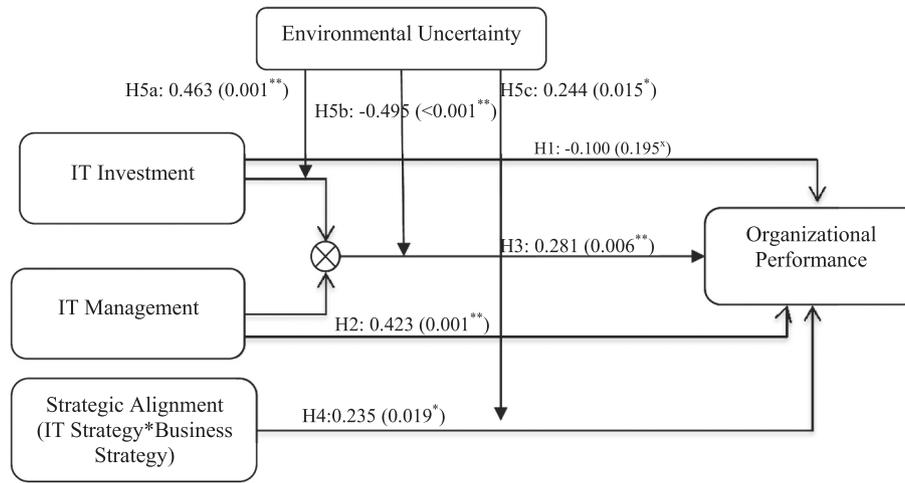


Fig. 2. Research model.
Note: P < 0.05*; P < 0.01**; Rejected^x.

Table 4
Hypothesis testing results.

Hypothesis	Path-coefficient	P-value	Results
H1 IT Investment - > Organizational Performance	-0.100	0.195	Reject
H2 IT Management - > Organizational Performance	0.423	0.001	Confirm
H3 IT management*IT investment - > Organizational Performance	0.281	0.006	Confirm
H4 Strategic alignment - > Organizational performance	0.235	0.019	Confirm
H5a Environmental uncertainty is positively moderates the relationship between IT management and organizational performance.	0.463	0.001	Confirm
H5b Environmental uncertainty is positively moderates the relationship between interactive role of IT management and IT investment in organizational performance.	-0.495	0.001	Confirm
H5c Environmental uncertainty is positively moderates the relationship between strategic alignment and organizational performance	0.244	0.015	Confirm

technical level and the resources and technologies are developed independently and the IT-business resources integration and coordination is in small organizational units. However, technical alignment cannot compensate for the incurred IT cost that can be further investigated in future research.

Further, according to Melville et al. (2004) three categories of factors affect the value of IT; focal firm; competitive environment (industry characters); and macro environment (country characters). In this study, the second category of “industry characteristics” has not been studied, which is a recommendation for future study to do a more comprehensive study by considering this factor.

The cultural components of society are effective in the acceptance of new information technologies and the success of investment in it. If companies are familiar with the effects of culture on information and communication technologies usage, they can provide the ground for IT adoption. Therefore, future studies are recommended to add culture to the proposed model and examine the impact of cultural dimensions on the value creation of IT in organizations.

This study was conducted before the covid-19 epidemic. Given that the demand for IT use in business has increased during the epidemic, it is

suggested that future research conduct similar studies in the Corona and post-Corona eras and compare the results.

Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Acknowledgment

This research did not receive any specific grant from funding agencies in the public, commercial, or not-for-profit sectors.

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