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Examining the relationships between organizational culture, knowledge management and environmental responsiveness capability

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Examining the relationships between organizational culture, knowledge management and environmental responsiveness capability

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Abstract

Purpose – The main aim of this paper is to study the effects of organizational culture on environmental responsiveness capability (ERC), both directly and through the mediation of knowledge management (KM) in selected Iranian Industrial Research Organizations (IIRO). Furthermore, the effects of four types of organizational culture on ERC and KM in the target population are compared.

Design/methodology/approach – Relationships between the ERC, KM and organizational culture are considered using survey data through the structural equation modelling approach. Five-point Likert questionnaire has been used as a tool for measuring variables. The authors sample includes 276 members of 13 selected target organizations whose names are not mentioned due to prior agreement.

Findings – Results show that organizational culture has a positive and significant relationship with ERC, both directly and indirectly through the mediation of KM. Additionally, compared with other types of organizational cultures, innovativeness culture has the highest correlation with ERC, both directly and through KM as a mediating variable. Furthermore, cooperativeness culture has a direct significant relationship with ERC, whereas consistency and effectiveness cultures indirectly have significant and positive relationships with ERC through KM. Therefore, results of this research provide appropriate evidence that ERC can be affected directly by innovativeness culture and KM.

Originality/value – The advantage of this paper compared to other related research is to study on ERC based on cultural and knowledge-related variables. Hence, it can extend the literature of ERC, and it can be useful for the managers who are dealing with industrial research company.

Keywords Environmental responsiveness capability, Organizational culture, Knowledge management, Iran

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1. Introduction

The increasing pace of globalization, competitive rivalry, customer demand shift and rapid technological advancements creates an environment in which sustained competitive advantage is difficult, if not impossible, to achieve (Bhatt *et al.*, 2010). Furthermore, the diversity and complexity of incidents and events which take place outside of the organizations and are usually accompanied by other uncertainties make prediction of the future trends even more difficult. Under these conditions, having high sensitivity and the ability to timely and quickly respond to market changes are vital necessities (Hurley and Hult, 1998; Wang, 2009) and key success factors (Bhatt *et al.*, 2010; Akhavan *et al.*, 2010; Jafari *et al.*, 2007; Jafari *et al.*, 2011) for companies; otherwise, the ignorance about environmental changes and lack of preparedness for future may lead to losing plenty of emerging opportunities and eroding the competitive advantage of organizations (Matson and McFarlane, 1999; Meehan and Dawson, 2002; Holweg, 2005; Storey *et al.*, 2005; Reichhart and Holweg, 2007). Hence, many of the pioneering companies try to continuously monitor the environment to maintain their competitive advantage and stay in the pace (Garrett *et al.*, 2009; Chao and Spillan, 2010).

Empowering performance in monitoring the environment with high sensitivity and fostering appropriate and timely reaction to its changes will enable organizations to go ahead and acknowledge emergent market needs and opportunities (Slater and Olson, 2002; Jafari *et al.*, 2010) for further exploitation. Therefore, it is quite necessary for organizations to improve such capabilities as tools for achieving and updating their competitive advantages. From this perspective, this study attempts to investigate the profound effects of knowledge management (KM) as a concept, beyond that of information technology and systems, upon the development of environmental responsiveness capability (ERC) towards introducing an effective tool for identification and analysis of environmental changes and provision of appropriate solutions. The fact is that KM increases the availability and accessibility of valuable knowledge at the right time and to the right person, respectively (Akhavan *et al.*, 2009), and provides the knowledge for a business to quickly adapt to new market conditions (Tseng, 2010; Jafari *et al.*, 2009). In addition to KM, organizational culture which has contextual effects on organizational processes (Jafari *et al.*, 2008) such as KM and ERC has been included in the research model as an independent variable. Furthermore, the effects of four types of organizational culture are subsequently compared. Finally, based on the analysis of the data collected from the sample population, the research hypotheses are tested and findings are presented accordingly.

2. Theoretical literature review

2.1 Organizational culture

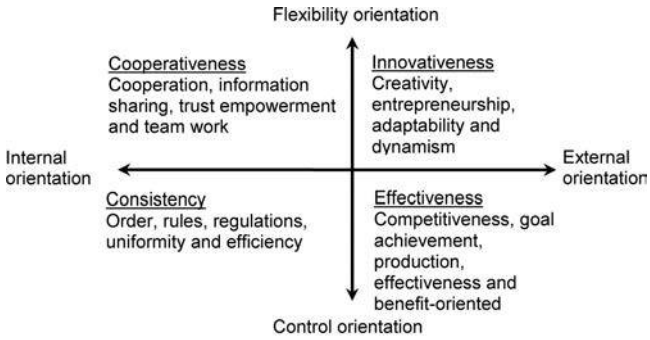
Organizational cultures represent the characteristics of an organization, which direct its employees' day-to-day working relations and guide them on how to behave and communicate within the organization, as well as how the company hierarchy is built (Ribiere and Sitar, 2003). From this perspective, culture is one of the most important features of an organization with contextual properties which can have both supportive and deterrent effects on all areas and activities of the organization, including responsiveness to environmental changes. Furthermore, organizational culture is one of the key success factors of KM because culture affects learning, acquisition, sharing and other related areas of knowledge (Alavi and Leidner, 2001; Gummer, 1998; Martin, 2000).

In contrast, organizational culture is also identified as the main barrier to the success of KM at organizations (Rastogi, 2000; Ribiere and Sitar, 2003). Therefore, the influence of organizational culture as the independent variable on ERC and KM is discussed in this paper. A review of the literature shows that organizational culture is usually a set of key values, assumptions, perceptions and norms shared between members of the organization and will be taught to newcomers as the correct way to behave and act (Schein, 1990; Deshpande and Webster, 1989; Cameron and Quinn, 1999; Miron *et al.*, 2004; Daft, 2005).

In comparative research, organizational culture is generally classified based on various characteristics. For example, Litwin and Stringer (1968), Ouchi (1980), Wallach (1983) and Weber (1947), although under different titles, all regard organizational culture as a combination of bureaucratic, innovative and supportive features. To investigate the correlations between various types of organizational culture and ERC and KM in target organizations, this study draws on Chang and Lin's (2007) conceptualization of organizational culture which is derived from Quinn's (1988) competing value model. Most of the models proposed by many researchers are compatible with the typology of competing value framework. Based on Google Scholar's report, Quinn's framework has been cited 1,661 times until 25 May 2013 which can be considered as the robustness of the model. Furthermore, when you check names of researchers who have cited Quinn's framework you can find well-known academics in organizational science, for example, Richrad L. Daft, Careth Morgan, Gary Yukl and Taylor Cox.

The competing value framework focuses on the main tensions and contradictions in human systems. Its primary emphasis is on the contrast between stability and change, and the contrast between internal and external environment. Because this framework touches on the fact that organizations seek rival and paradox values, it is called competing value approach. Figure 1 illustrates four types of cultures which are formed by the intersection of these two dimensions.

In this model, the trait which emphasizes flexibility and internal orientations is named cooperativeness culture. This type of organizational culture provides a warm and friendly working environment and therefore enhances employee's participation, information and knowledge exchange, trust, empowerment and team work (Chang and Lin, 2007). Innovativeness culture which is characterized by flexibility and external



Source: Chang and Lin (2007)

Figure 1.
Organizational culture framework

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orientations provides a creative and dynamic environment and emphasizes on risk taking, entrepreneurship, adaptability and dynamism (Cameron and Quinn, 1999). Consistency culture emphasizes on internal and control orientations. It typically creates formalized and regular working conditions and tends to control employees accordingly. This type of culture, also referred to as hierarchical culture, focuses on order, uniformity, efficiency, rules and regulations. Finally, effectiveness culture which is the product of environmental and control orientations enhances competitiveness, goal achievement, production, effectiveness, benefit-oriented measures and produce a profit-oriented organization (Cameron and Quinn, 1999).

2.2 Knowledge management

Today, knowledge is a vital necessity and is considered as a power source (Aujirapongpan *et al.*, 2010) for the success of any organizational effort, particularly activities such as identifying and responding to environmental changes which deal with the exchange and production of data, information and internal and external knowledge between different people. While knowledge is different from data and information, it is related to both of them (Davenport and Prusak, 1998). Malhotra (1997) defines KM as a synergistic combination of data and information processing capacity of information technologies, and the creative and innovative capacity of human beings. Davenport and Prusak (2000) also regard knowledge as a fluid mix of framed experience, values, contextual information and expert insight which provides a framework for evaluating and incorporating new experiences and information. Then, they defined KM as the management of a corporation's knowledge through a systematic and specified organizational process for acquiring, organizing, sustaining, applying and sharing knowledge to achieve competitive advantage. Clemmons (2002) also views KM as a systematic process by which the knowledge needed for the success of the organization is identified, generated, shared and used. Literature review shows that despite differences in the definition of knowledge and KM, some general processes of KM which have been frequently cited by scholars can be identified and classified into four specific categories. Table I depicts the findings of eight prominent theoreticians which formed a foundation for the development of the research model.

Reference	Generate/acquisition	Organizing/ saving	Dissemination/ sharing	Application
Pentland (1995)	Construction	Organization storage	Distribution	Application
Nonaka (1995)	Creation	Access	Dissemination	Application
Demarest (1997)	Construction	Embodiment	Dissemination	Use
Liebowitz (1999)	Identify capture	Store	Share	Apply/sell
Davenport (2000)	Develop	Organizing	Dissemination	Asset management
Celemmons (2002)	Identify generate		Share	Application
Gelinas (2004)	Detection	Saving Retrieval	Distribution	Use
Jennex (2008)	Acquisition	Evaluating storing	Dissemination	Application

Table I. Classification of KM processes

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As can be seen in Table I, many researchers have described KM and its processes. We present our definition of KM as processes of generating and acquiring, organizing and storing, dissemination and sharing and application of knowledge to deliver the right knowledge to the right people at the right time to help them make right decisions and do their jobs. This kind of induction has been used frequently in different scientific texts (Choi and Lee, 2000; Holsapple and Joshi, 1999; Chen and Chen, 2005. Furthermore, Burk (1999) has classified KM processes into four major categories which are somehow the same as our taxonomy.

In fact, knowledge generation and acquisition, also described by other terms such as "capture", "construction" and "creation", is the process of developing and replacing new knowledge with existing knowledge in the tacit and explicit knowledge database (Nonaka and Takeuchi, 1995). Knowledge storing and organizing is the accumulation, documentation, classification, archiving, storage and preparation of knowledge to facilitate its exploitation and distribution. Sharing and dissemination of knowledge include exchange, transportation and distribution of appropriate knowledge to right individuals and groups. The term "sharing" is mostly used for tacit knowledge and "dissemination" is used for explicit knowledge. Because identification, generation, organization and dissemination of knowledge alone do not guarantee its exploitation and value, the last process of the knowledge application enjoys utmost importance.

2.3 Environmental responsiveness capability

From the perspective of resource-based theory of firms, market responsiveness reflects company's ability to reconfigure its competencies and organizational resources to adapt with new environmental requirements (Wang, 2009). By taking advantage of this capability, firms can easily and rapidly develop and execute market-oriented strategic actions including creating new products, designing new business models, delivering new values to customers and tapping into new market segmentation (Wang, 2009). This alone requires organizational flexibility and adaptability (Randall *et al.*, 2003).

Environmental identification and responsiveness is the firm's ability to rapidly sense, identify and respond to the environmental changes, including customer demands, competitor moves and market trends (Nidumolu and Knotts, 1998). Prahalad and Hamel (1990) emphasize that companies should deepen their understanding of laws in industries and seize upon changing trends. Jiao *et al.* (2010) believe that understanding the consequences of current environmental developments is essential. Companies should generate, disseminate market intelligence and adjust product designs and customer services to fit the needs of diverse customers and market segments (Kohli and Jaworski, 1990). Although customer is the primary focus of a company's concern, it is necessary for companies to broadly understand other changes in market conditions such as competitors' behaviours, suppliers, etc. which may significantly impact the company's performance in competition (Jaworski and Kohli, 1993). Therefore, the ERC is not only limited to sales or marketing department but should spread throughout the organization, and all units should carefully monitor the environmental trends.

A review of the literature shows that a comprehensive definition of the environmental responsiveness and sensitivity capability has not been proposed yet, and this concept still falls into ambiguity and complexity (Kritchanchai and MacCarthy, 1999). However some, such as Upton (1995, p. 205), believe that the ambiguity and complexity in some concepts represent their potentials of influencing management. To

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develop the ERC construct, we draw up the main focus of different definitions (Table II) and interpretations of ERC presented by different scholars.

Bernardes and Hanna (2009) state that all the definitions of the ERC emphasize on three pivotal points. First, all the definitions associate responsiveness with the terms such as customer's needs and demands (Tunc and Gupta, 1993), requests (Holweg, 2005), orders (Upton, 1995) and market signals (Catalan and Kotzab, 2003) and exclusively to external stimuli (Reichhart and Holweg, 2007). Second, all of them emphasize on the dimension time with such expressions as timely (Tunc and Gupta, 1993; Chen *et al.*, 2004), appropriate timescale (Barclay and Dann, 1996), time-effectively (Catalan and Kotzab, 2003) and speed (Reichhart and Holweg, 2007). Third, there are indications that the nature of responses should be relevant. Such relevance can be inferred through terms of intelligence, awareness (Kritchanchai and MacCarthy, 1999), effective solution, excellence maker, etc. (Barclay and Dann, 1996). Thus, in this research, the ERC is defined as a kind of competence which enables organizations to quickly identify environmental changes and respond to them appropriately.

2.4 Organizational culture and ERC

The confidence formed by some organizations with some others can make an important capability which may not be emulated by other contestants. This capability is an organizational property, established on a variety of trustworthy activities by them to decrease their influence on natural surroundings in collaboration with a number of stakeholders. This organizational ability is different for each company. It depends on basic development in organizational viewpoints and ideas attached with modifications in organizational atmosphere over a period of time. This capability is an internal social ability because it is inherent in employees' behaviour based on organizational culture. Simultaneously, this capability is an external social ability on the basis of cooperative confidential connection between company and boundary stakeholders (Coff, 1997). So based on what discussed previously, we assume the following hypothesis in this study:

H1. Organizational culture directly affects ERC.

2.5 Organizational culture and KM

Researchers who examine KM programs are unsuccessful to show that organizational culture is one of the key success factors (Yang, 2007). Lim (2002) believes that when implementing KM programs, organizational culture should be taken into consideration

Definition	Reference
A firm's ability to respond in a timely manner to customer's needs and wants	Tunc and Gupta (1993)
The ability to react purposefully and within an appropriate timescale, to significant events, opportunities or threats to bring about or maintain competitive advantage	Barclay and Dann (1996)
The ability of a manufacturing system to make a rapid and balanced response to the predictable and unpredictable changes characterizing today's manufacturing environment	Gindy *et al.* (1999) and Saad and Gindy (1998)
The ability to respond and adapt time effectively based on the ability to read and understand actual market signals	Catalan and Kotzab (2003)

Table II. Definitions of ERC

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as well as technological aspects. In fact, appropriate organizational culture that is required to foster KM activities should be developed. Employees' behaviour in terms of knowledge sharing can clearly show organizational culture (Shin, 2004). So, organizational culture and reward systems should be reformed to encourage people to share their knowledge with the other employees (Chua and Lam, 2005; Tseng, 2010). In fact, organizational culture performs a significant function in managing knowledge. So, the relationship between organizational culture and KM should be investigated. Therefore, on the basis of the previous discussion, we propose the following hypothesis in this research:

H2. Organizational culture directly and positively affects KM.

2.6 KM and ERC

Nowadays, new product and service developments should be explored to develop goods and services that respond to social and environmental needs. This man-made stuff must be able to completely guard humankind from unwanted modifications in the environment. So, by redesigning products and services, novel value-added stuff can be made containing materials that keep routine specifications but with modern functionalities which arise from environmental responsiveness capabilities of firms. This knowledge-based stuff with developed specifications and environmental responsiveness may be called smart goods.

Bukowitz and Williams (2000) present a KM framework. The framework tries to show how companies create hold and apply a proper supply of knowledge to generate value. In their model, knowledge is a composition of relationships, knowledge repositories, information technologies, environmental responsiveness, know-how and external sources. Their KM cycle consists of seven phases which are to get, use, learn, contribute, assess, build/sustain and divest. The assess, build/sustain and divest phases are more strategic, initiated by changes in environment. Hence, based on the previous discussion, we suggest the subsequent hypothesis:

H3. Knowledge management directly and positively affects ERC.

3. Conceptual model and research hypotheses

Based on the literature review and the in-depth discussion presented so far, the conceptual model of the study containing the proposed relationships among three research variables is developed as follows:

In this model, KM (mediator variable) and organizational culture (independent variable) have been considered as second-order intent constructs. In the case of organizational culture which enjoys four dimensions of cooperativeness, culture, innovativeness culture, consistency culture and effectiveness culture, it should be noted that this generalization is based on the assumption that each organization possesses some features of all four types of cultures with different high and low intensities (Quinn and Spreitzer, 1991). So based on Figure 2, the main research hypotheses will be as follows:

H1. Organizational culture directly affects ERC.

H2. Organizational culture directly affects KM.

H3. KM directly affects ERC.

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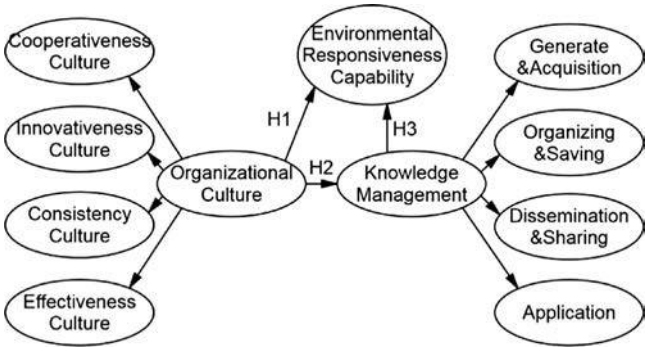

Figure 2.
Main research model

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4. Research methodology

This study is in conformity with the positivistic research paradigm, which assumes that an objective or a reality exists and can be generalized, and the researcher observes the problem domain as an observer. In addition, this study includes developing theoretical hypotheses to be tested to explain and predict the real-world phenomenon of the impacts which organizational culture and KM have on ERC in IIRO.

There are two major quantitative approaches: experimental and survey research methodologies. The objective of this study focuses on the "what" research question. It focuses on contemporary events and does not require control of behavioural events. Therefore, usage of survey research methodology seems appropriate for this study, while the circumstances are not appropriate for conducting an experimental research plan (Yin, 1994).

This study adopted a research design model developed by Sekaran (1992). The research design adopted for this study was based on the hypothetico-deductive method. This method starts with a theoretical framework, formulates hypotheses and makes logical deductions from the results of the study. The hypothetico-deductive method broadly divides a research design into a series of steps that lead to answering the research questions (Sekaran, 1992).

The data and information collection methods are based on library studies and questionnaire technique. The conceptual model of research has been developed with good justifications from library studies and each of its variables has been measured through the questions derived from the literature. The data obtained were analyzed using structural equation modelling with AMOS software. The research hypotheses were subsequently examined and the findings were presented.

4.1 Statistical sample

Sampling strategies can be divided into two groups: probabilistic and non-probabilistic. Non-probability sampling can be applied when the researcher prefers visible members of population or when some members have no opportunity to be selected. Probability sampling is useful where it is important to have a typical sample of the population.

The statistical population of the research includes Iranian Industrial Research Organizations (IIRO) which are run in different fields. They are scattered in different provinces of Iran and some of them are out of access. So non-probability strategy for sampling needs to be selected. Non-probabilistic sampling procedures include

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purposive, quota and accidental sampling. When using accidental sampling, a sample is nominated because it is close at hand and readily available.

The statistical sample of the study contains 13 accidently selected IIROs which are run in different fields such as physics, chemistry, nanotechnology, mechanic and electronic. These companies are located in five provinces of Iran. A total number of 276 personnel, managers and deputies of these 13 organizations constituted the sample size. The data were collected using a questionnaire fully explained to the personnel in advance. Table III summarizes the descriptive part of the data from the sample population.

4.2 Measures

To collect data needed for the research, the questionnaire was developed based on literature review and consulting with experts as follows:

4.2.1 Organizational culture. We used a questionnaire survey approach to collect data, and we measured the four organizational culture types using the 5-point Likert scales (1 = strongly disagree to 5 = strongly agree as pole extremes) specified and validated by Chang and Lin (2007). In the questionnaire, eight items measured cooperatives culture, six items were used for innovativeness culture, six items evaluated consistency culture and six items were utilized for effectiveness culture.

4.2.2 Knowledge management. The respondents rated KM on a five-point scale for four dimensions:

(1) generation and acquisition (GE);
(2) saving and organizing (OR);
(3) dissemination and sharing (ST); and
(4) application (AP).

Drawing upon previous studies (Jones, 2009; Garrido-Moreno and Padilla-Melendez, 2011; Handzic, 2011), GE was measured with three dimensions: knowledge generating and acquisition mechanisms, fulfilling knowledge gaps and processes for creating new knowledge based on previous knowledge. OR was measured with four dimensions: mechanisms for documentation, databases and data warehouse and mechanisms for knowledge refinement. ST was measured with three dimensions: mechanisms for knowledge sharing, existence of library and document centres and existence of knowledge-sharing spaces such as communities of practice. AP was measured with three items: mechanism for using knowledge, development of employees' operational knowledge and combination of existing knowledge to satisfy competitive needs.

4.2.3 Environmental responsiveness capability. The respondents rated ERC on a five-point scale for the following four dimensions:

(1) market responsiveness (RE);

Table III. Descriptive information of sample

Occupation (per cent)	Expert (26)	Supervisor (16)	Manager (47)	Assistant (11)
Education (per cent)	Associate degree (10)	Bachelor: (74)	Master: (15)	PhD: (1)
Work experience (year: per cent)	< 5:6	< 5-10:14	10-15:25	> 15:55
Age (year: per cent)	< 30:7	30-35:19	35-40:27	>:47

(2) organizational learning (LE);
(3) re-coordination (CO); and
(4) integration (IN).

Drawing upon previous studies (Nidumolu and Knotts, 1998; Pavlou and ElSawy, 2006), RE was measured with four dimensions:

(1) agility to response to environmental changes;
(2) monitoring the environment for identification of new business opportunities;
(3) agility to enter new markets and developing new products; and
(4) sensitivity to competitors' innovations.

LE was measured with four dimensions:

(1) organizational desire for improving employees' abilities;
(2) learning atmosphere;
(3) failures as standpoints for learning; and
(4) encouraging atmosphere for sharing ideas.

CO was measured with four dimensions:

(1) coordination between organizational processes and employees' abilities;
(2) assignment of activities to employees based on their abilities;
(3) effective assignment of resources to projects and processes; and
(4) coordination of organizational processes.

IN was measured with five dimensions:

(1) defining new activities based on new situations;
(2) reintegration of organizational processes;
(3) cooperation of different departments;
(4) integration of divisional and organizational objectives; and
(5) comprehensive understanding about organizational task.

4.3 Reliability and validity of the questionnaire

The reliability of the different parts of the questionnaire was verified according to Cronbach's alpha coefficient, with the alpha values of:

- 0.87 for cooperativeness culture;
- 0.86 for innovativeness culture;
- 0.83 for consistency culture;
- 0.86 for effectiveness culture;
- 0.77 for knowledge generation and acquisition process;
- 0.74 for knowledge dissemination and sharing process;
- 0.86 for knowledge application process;
- 0.82 for knowledge organizing and storing process;

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- 0.88 for ERC;
- 0.96 for the total organizational culture variable; and
- 0.91 for total KM.

4.4 Measurement models of the research

Prior to the formation of primary and secondary research models and testing hypotheses, each research variable was introduced as a distinct construct. Here these are two kinds of construct. The first-order intent construct comprises the variables of innovativeness culture, consistency culture, effectiveness culture, cooperativeness culture, ERC and the underlying KM processes. The first-order intent construct also comprises the variables of KM and organizational culture. To avoid reducing the sample size, missing data were treated through the maximum likelihood method using AMOS software. Each of the research constructs was analyzed using the confirmatory factor analysis approach. The global and detailed fit measures and the significance of factor loadings were separately calculated. Results reflected a desirable fitness and appropriate global fit measure, and the significance of all factor loadings was at $p < 0.001$ for all models. It should be noted that in the SEM with the application of factor loading method, intent measurement constructs which are usually oval-shaped are modelled through observed variables (statements) which are usually rectangle-shaped. Furthermore, one measurement error is given to each of the observed variables, and for each of the intent variables, one structural error is assigned. Accordingly more precise results are obtained compared to the results that could be obtained through same other traditional statistical approaches.

4.5 The structural model of the research

After examining each individual factor model, structural model of the research was developed and analyzed with standard results presented in Figure 3. For simplicity, the display variance of observed values options is disabled in the output. Some of the most important fit measures for the model are as follows:

- the value obtained for chi-square is 1,353 at the significant level of $p < 0.001$;
- chi-square/df equal 1.68; and
- other measures include: incremental fit index (IFI) = 0.91, Tucker-Lewis index (TLI) = 0.90, comparative fit index (CFI) = 0.91, normed fit index (NFI) = 0.81, parsimony-adjusted normed fit index (PNFI) = 0.81, parsimony-adjusted comparative fit index (PCFI) = 0.82, parsimony ratio (PRATIO) = 0.9 and root mean square error of approximation (RMSEA) = 0.05.

The above indicators altogether indicated a desirable fit.

Minor fit measures showed that the regression coefficient for all three paths was at the significance level of $p < 0.001$, and thus all the three primary hypotheses were validated.

Following the above framework, a subsidiary research model was developed to compare the effects of four types of organizational culture on KM and ERC in the target population, as depicted in Figure 4.

Output indicators expressed that the coefficients obtained for the relationships between cooperativeness culture and KM and the relationship between effectiveness

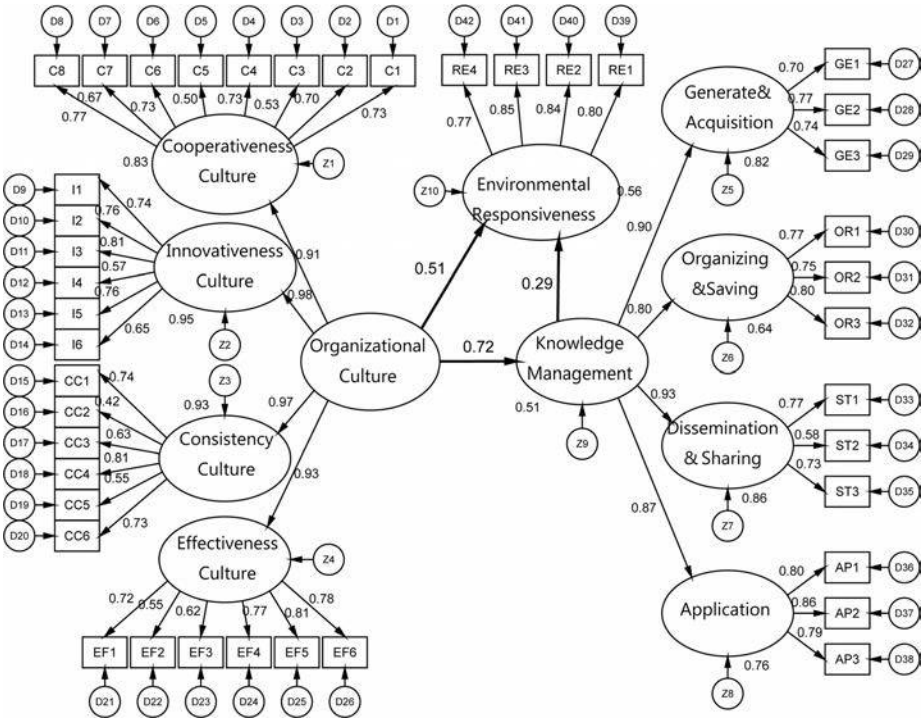

Figure 3.
The results of main model in standard mode

culture and ERC were not significant. Therefore, the associated paths were deleted from the model and the measures were recalculated. The final model can be seen in Figure 5. It should be mentioned that if the correlations between each type of culture with either KM or ERC were singularly calculated, then all the obtained values are significant at the level of $p < 0.001$, as depicted in Table IV. Nonetheless, as all four types of cultures in the secondary model appear as competing with each other, the culture types with higher degree of correlation coefficient leave an impact on other lower degree ones.

5. Discussion

Results from the main model of research show that the relationships between the three main variables are positive and significant. Therefore, the three main hypotheses are confirmed to be valid. The regression coefficient between organizational culture and ERC is 0.51, while this coefficient between KM and ERC is 0.29. Because the coefficient values for organizational culture path are higher than those of KM whose effects are partially due to the impacts of organizational culture through the mediation of KM, it can be concluded that the ERC in target organizations is mostly affected by organizational culture rather than by KM. One of the main reasons for this generalization could be attributed to the fact that KM as an integrated system is in its early stages of development in most target organizations. Hence, the overall consequences of implementing KM upon various organizational procedures and activities, including ERC, have not yet reached their maturity in the organizations

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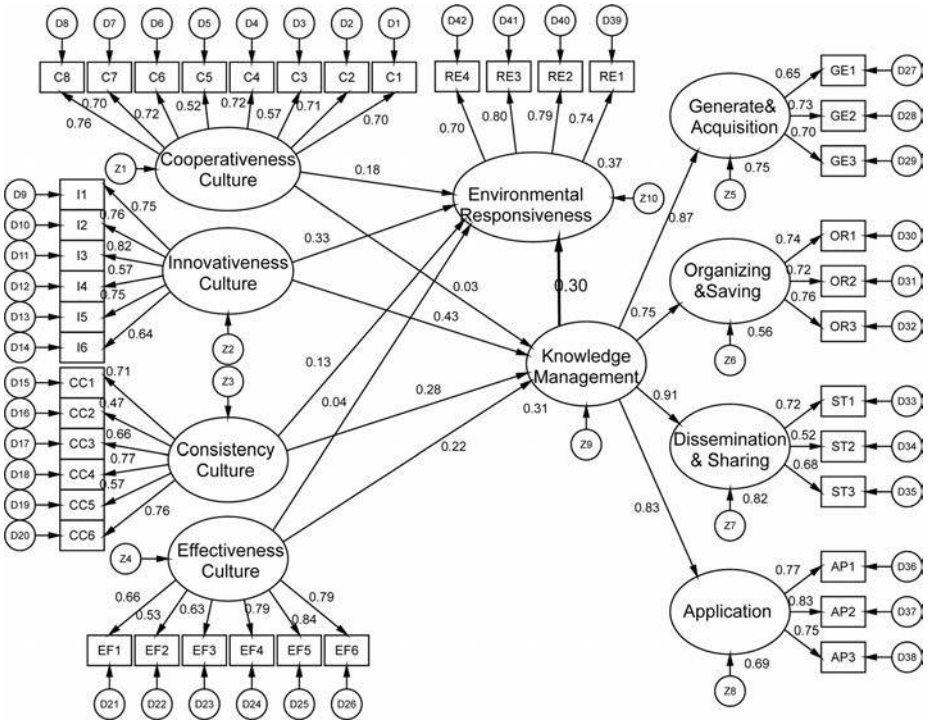

Figure 4.
The results of subsidiary model in standard mode

studied in this research. On the other hand, one should regard KM as a tool when investigating its effects on ERC as compared with the effects of organizational culture which inherently represents organizational tendencies and orientations and can be regarded as the main root in many of the organizational decisions and behaviours. However, given the conditions that the prevailing organizational culture is appropriate and supportive towards ERC and that KM has reached its maturity, we may expect maximum synergy between these two variables in the development of ERC. Thus, there is good justification for regression coefficient between organizational culture and ERC to be higher than that of the KM path in the main model of the research.

Results from the secondary model indicate that innovativeness culture, as compared with other cultures, enjoys the most correlation with ERC, both directly and indirectly through KM. Next, cooperativeness culture is placed second on directly affecting the ERC, and its indirect effect through KM is insignificant in the model. It must be noted that if the relationships between each of these cultures with KM or with ERC are separately modelled, all of the results will be positive and significant as depicted in Table IV. However, under the conditions that all four types of cultures as independent constructs are simultaneously modelled, as each type has contrasting nature with respect to others, the culture that enjoys the most correlation with dependent variable modifies and, to some extent, neutralizes the effects of other cultures.

Following cooperativeness culture, consistency culture and effectiveness culture are respectively correlated with ERC through the mediation of KM, with their direct

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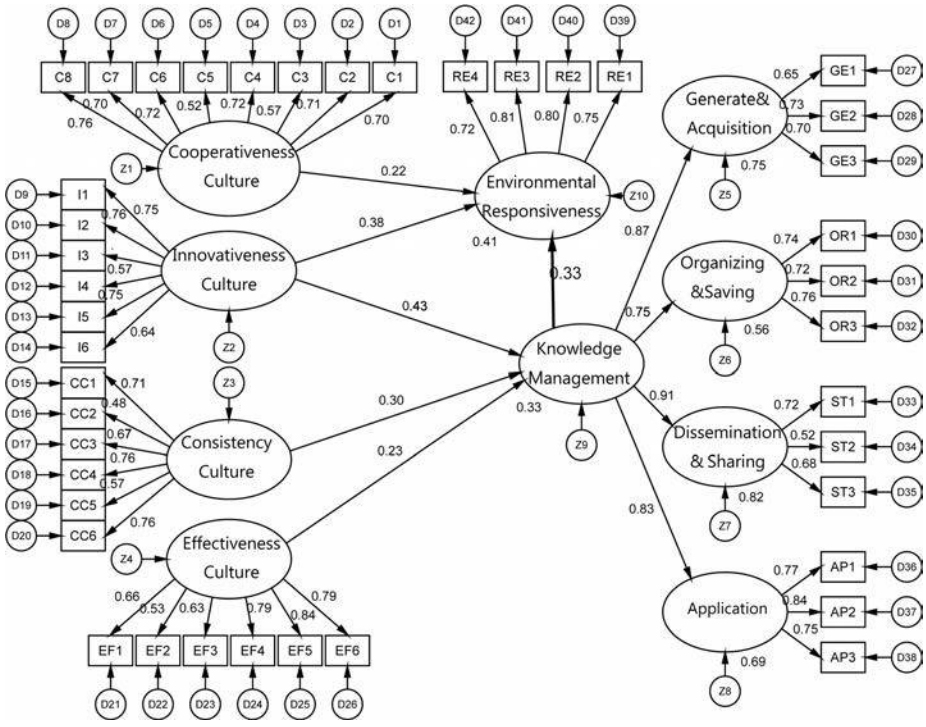

Figure 5.
The results of the modified subsidiary model in standard mode

Type of Culture	KM	ERC
Innovativeness culture	0.71	0.72
Cooperativeness culture	0.62	0.66
Consistency culture	0.69	0.68
Effectiveness culture	0.67	0.65

Table IV.
Correlation values in the singular models

relationship being insignificant. Accordingly, the order of these four cultures in terms of their strength in affecting the ERC can be stated as innovativeness, cooperativeness, consistency and effectiveness culture. Thus, the cultures from the upper part of Figure 1 have the most impact an ERC, and therefore, it can be concluded that flexibility orientation as compared with external orientation is more significant in affecting the dependent variable of the study. Such conclusions comply well with literature findings, as some researchers (Barclay and Dann, 1996) believe responsiveness and flexibility to be so closely correlated that each can be used in the place of the other.

Bernardes and Hanna (2009) and Verdu' *et al.* (2009) believe that organizational flexibility is the most important capability that enables organizations to be responsive to environmental changes because organizations can easily, and without much difficulty, apply necessary changes to adapt to the environment. Thus, it seems that flexibility on the first level and external orientations on the second level tend to be most

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effective in affecting ERC. Innovativeness culture hereby stands first and cooperativeness culture is ranked second.

Because consistency culture and effectiveness culture are both supportive towards control-based orientations, it seems logical that they affect the ERC mainly through systematic processes. This provides justification for their direct relationship to be insignificant while it is significant through the mediation of KM. Accordingly it also seems logical that effectiveness culture and consistency culture stay third and fourth, respectively, in the ranking. One of the main reasons for effectiveness culture to stay last in the ranking is that all target organizations of the study are governmental agencies and that the effectiveness culture in these agencies enjoys a mission orientation. This means that even though the mission-seeking organizations enjoy effectiveness culture which is seemingly oriented towards external adaptation, the nature of such orientation is strongly towards pursuing organizational mission and objectives rather than adapting to environmental changes. Therefore, among the aforementioned cultures, effectiveness culture has the least effectiveness with respect to ERC. The reason behind the superiority of consistency culture over effectiveness culture in affecting the target population's KM is obvious and twofold:

(1) Consistency culture, by its nature, supports the internal processes and systems. Such a support can encompass all KM processes and initiatives.

(2) As stated earlier, the KM systems and the infrastructure in target units have a short history of formation and have not yet reached the desired level of maturity. Such a condition paves the way for consistency culture to play a significant role in promoting KM initiatives.

The overall conclusion strongly suggests that the innovativeness culture leave the highest positive impact on both ERC and KM in target organizations. Such a generalization is more relevant for research-based establishments.

6. Conclusion

In today's world of turbulent conditions and intense competition, the ability of organizations to consistently track environmental changes and undertake timely and appropriate responses is considered as an important source of sustainable competitive advantages. This ability, called in this paper as ERC, exists in all proactive organizations to some extent. Nevertheless, the degree of success in grasping the future business opportunities lies in the strength of organizations to wisely develop such capability and implant the related infrastructures. Given this orientation, the current research attempted to investigate the combined effects of KM and organizational culture on the degree of ERC in the target population. The introduction of KM as an effective variable in conceptual framework of the study was mainly due to its role in detecting environmental signals and changes, analyzing the collected data and information, as well as providing appropriate responses to detected facts. In addition, the tendency of global business and economy towards knowledge-based orientations has forced many pioneer companies to put KM at the top of their strategic agenda. The importance of organizational culture as an independent variable of the framework was mainly rooted in its role as a contextual factor that brings excellence in all domains of management. Results from structural modelling of relationships among research variables showed that the ERC in target population is primarily influenced by the prevailing

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organizational culture and by KM standing in the second place. This is just because KM systems in target organizations are in their early stages of development and, consequently, with low impact on the ERC.

The comparison among the effects of various kinds of organizational cultures, as depicted in the secondary research model, indicated that innovativeness and cooperativeness cultures directly have the most positive effects on ERC. The order of the cultures affecting the ERC through the mediation of KM can be listed as innovativeness, consistency and effectiveness cultures standing in the first, second and the third ranks, respectively.

Prior to discussing the implications of the study, certain limitations inherent in the study should be acknowledged. Lacking a national scale for organizational culture, KM and ERC, we used the scale developed by some other researchers that might not reflect the actual situation in Iran due to specific national environment.

The next possible limitation refers to utilizing a cross-sectional survey across 13 selected IIROs. So, the results may not be valid for generalizing to all industrial sectors in Iran. Although there are some similarities between Iran and some other developing Middle East countries, the results may not apply to organizations in other countries.

Results would guide managers' efforts in the development of an organizational culture that facilitate both KM processes and ERC. Exploring different types of organizational culture which tie KM processes with ERC is crucial for the development of a leadership template which emphasizes fostering cultural and KM aspects.

In particular, if the company can support innovativeness and cooperativeness cultures, it can be easy to construct an atmosphere where human resources can have peer-learning, and also have the chance to be creative, enhance organizational performance and develop the ability to respond to environmental competitive changes.

While this work provides first insights regarding the relationship between organizational culture and ERC through the mediation of KM, this research field should be extended to understand how to create more value from these relationships.

Complementarities among organizational culture and ERC (centralization, leadership, organizational learning, etc.) should be explored, as it could add more insights to this field.

Finally, it is required to identify any industry, country or even cultural dependence that may affect these relationships.

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