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Investigating The Effect of Intellectual Capital on Organizational Performance and Mediating Role of Entrepreneurial Orientation

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In the knowledge-based economy, the most successful organizations will be those who use their intellectual capital in the most effective ways to improve performance. On the other hand, achieving high levels of organizational performance requires the creation and development of entrepreneurial orientation. The main objective of this study is to evaluate the effect of intellectual capital on entrepreneurial orientation and performance. Hence, one of the factors that could play an important role in enhancing the capabilities of human resources and tendency of organizations to be entrepreneurial is the evaluation and use of Intellectual capital in an appropriate way. Overall, we can say that increase in intellectual capital will result to improvement of knowledge resources, Organization's readiness to take an appropriate decision under uncertainty, increase in production of new products and development of entrepreneurial activity. Therefore firms with higher entrepreneurial orientation can shape their internal resources better to improve their work performance. This study is based on methodology of the structural equation model. It is a descriptive-correlation study that examined the relationship among the study variables. The data for this study was obtained from managers of manufacturing firms because they are fundamental source and potential entrepreneurs. The results show that all dimensions of intellectual capital positively affect entrepreneurial orientation. Based on the results human capital makes the greatest impact on organizational performance and also entrepreneurial orientation significantly has an impact on organizational performance. This study focuses on testing the mediating effect of entrepreneurial orientation on the relationship between intellectual capital and organizational performance in Malaysia.

1. Introduction

The transformation of societies from the industrial age to the information age has made it feasible for us to see in modern day economy that physical and financial capital has been replaced by knowledge as the most important capital (Chen *et al*, 2004; Michalski and Javier Vazquez, 2008, p.23). In the knowledge economy, businesses need to use an approach to better utilize their tangible assets such as

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physical and financial assets and intangible assets such as organizational knowledge and competencies of human resources (Bontis, 1999). Intellectual Capital is considered valuable resource for organizations in the development of entrepreneurship and innovation (Michalski and Javier Vazquez, 2008).

Knowledge management of resources, which is distinguished by the complicated and dynamic competitive environments, knowledge-based resources (human capital, structural capital and market capital) express the source of competitive benefit for the enterprises In order to be able to possess the prospects make product and procedure innovations, be proactive in the market place, entrepreneurial firms have to reconfigure their intangible assets (Jantunen et al., 2005).

In the other side, a firm entrepreneurial orientation refers to the entrepreneurial activities, how the entrepreneur undertakes the methods, practices, and decision-making styles to act entrepreneurially. According to Mintzberg (1973) specifically, entrepreneurial orientation refers to the entrepreneur's disposition to autonomy, encourages experimentation, takes risk, takes initiatives, and aggressively competes within its market, so entrepreneurial orientation is an important factor to play active and effective role in the domestic and international competition. Companies with higher entrepreneurial orientation will make the best of their resources to improve work performance (Hughes and Morgan, 2007).

This study tries to find relationship between intellectual capital and business performance. Then, it focuses on the impact of entrepreneurial orientation in this relationship. This paper is introduced as follows: Firstly, we briefly review intellectual capital and entrepreneurial orientation and their relationships with performance. Then, we present the model and the hypotheses that are going to be tested in the last part of this research. Finally, discussion and conclusions are provided in the last section.

2. Literature Review

Researchers agree that the twenty-first century is the century of knowledge economy. In the knowledge economy, intellectual capital is considered as the most important organizational intangible assets and as the primary principle of value creation; intellectual capital has become more important than physical capital. Hsu and Fang (2009) define intellectual capital as a set of knowledge, culture, strategy, process, intellectual property and communication networks of companies that created competitive advantage for organizations and help to achieve their goals.

Many scholars and researchers mentioned that today's world as age of discontinuity. Ages of discontinuity, means that past experiences and solutions are not suitable for current and future issues of organizations. Researchers should think and look for the other ways and new organizational approaches to present goods and services with minimal cost and high quality fit to the customer needs and tastes (Nikoomaram, 2006).

In this atmosphere considering the environmental uncertainty, complexity, increased competition and rapid technological progress, large and small companies must be innovative and react quickly to maintain their competitive ability (Ireland, *et al*., 2001). Companies must continually identify new opportunities and convert them to income;

meaning that they should behave entrepreneurial; because only in such circumstances can companies provide the necessary resources for growth and development of production and human resources, create new business and employment, as well as use the industrial innovation and development to increase the range of products and services (Shane and Venkataraman, 2000).

Institutional entrepreneurship is the set of activities that has resource and support of organization in order to reach innovative results (Imanipour, 2008). Based on the study of Lumpkin and Dess (1996), companies that want to have a successful corporate entrepreneurship should have an entrepreneurial tendency. Entrepreneurial orientation is the new branch of entrepreneurship and refers to the all the actions, processes, procedures and decision making activity that caused to enter new business and support entrepreneurial activities (Mintzberg, 1973).

Entrepreneurial orientation describes the ability to recognize or create an opportunity and take action aimed at realizing the innovative knowledge practice or product. Entrepreneurial orientation is different from 'traditional' economic entrepreneurship in that it does not aim at the realization of monetary profit or to maximize monetary profit, rather it focuses on opportunities with the goal to improve the production (research) and amount of knowledge in personal transformation (Harvey & Knight, 1996).

Entrepreneurial orientation includes five dimensions: innovation, risk taking, pro activeness, autonomy and competitive aggressiveness (Lumpkin and Dess, 1996). These dimensions are briefly explained below:

Innovation refers to the company's willingness to support creativity and new ideas, experiments to produce new products and services, technological leadership, research and development and so on, in order to create new processes.

Risk taking is the tendency to perform activities such as investment in unknown new markets, involving a large part of resources for investment projects with uncertain outcomes and heavy borrowing.

Pro activeness is having a futuristic vision, in order to identify opportunities for new products and services, and to anticipate future market needs ahead of competitors.

Autonomy refers to the independent activities of a person or group to create an idea or insight and guidance until they are completed. With Creating Independence, managers show their faith to the ability of employees to employ such ideas into policies and to encourage employees to participate in entrepreneurial activities.

Competitive aggressiveness is the company's tendency for strong and direct challenging of competitor to enter new areas and improvement of the its position which forces the organization to makes its activity practical in the market ahead of the competitors (Lumpkin and Dess, 1996, p.140).

In an era when changes occur rapidly in various fields, a community that can use entrepreneurship to a knowledge-based economy will be pioneer (Wu *et al*, 2008). Entrepreneurs should create value creation chain with the conversion of knowledge to innovation that leads to wealth accumulation and employment of manpower.

Therefore, the evaluation and use of intellectual capital in appropriate way could play an important role in enhancing the capabilities of human resources and organizations that tend to be entrepreneurial. Studies conducted show that having workers with top ability and high experience will help the organizations to create internal knowledge and gain external knowledge which leads to improve learning and innovation in organizations (Hsu and Fang, 2009).

Davenport and Prusak (1998), suggested that investment in information technology field, promote organizations to gain external knowledge and helps organizations to increase their knowledge resources.

Thus, with the development of structural capital, companies can improve their entrepreneurial activities. The past research results also indicate that, capability of receiving market information and being awareness of customer needs make the company to be pioneer. Identifying the needs and demands of customers as well as benchmarking competitor's products can help entrepreneurs offer superior products to their customers (Hughes & Morgan, 2007).

Focusing on customers and competitors, as one of the main components of entrepreneurial orientation is the main key to be pioneer leadership. Market orientation as one of the signs of relational capital that indicates market intelligence in organizational level pertaining to the existing and future needs of customers, it also help in obtaining data from customers and competitors by focusing on them and disseminated within the organization thereby helping to promote entrepreneurial orientation. (Kohli and Jaworski, 1990).

On the whole it could be said that increase in the intellectual capital led to increase in knowledge resources, organization's readiness to take appropriate decision under uncertainty, production of new products and development of entrepreneurial activities. Assumptions are presented below:

H_1: Internal capital is correlated to entrepreneurship orientation.

H_2: Linkage capital is correlated to entrepreneurship orientation**.**

H_3: External capital is correlated to entrepreneurship orientation.

Bullen and Hua (2002) explained that the world is entering to a knowledge society that the most important source of its economy is knowledge. In this modern economy, intellectual capital is the most important organization's assets and the potential success of the organization is rooted in their intellectual abilities. Intellectual capital significantly effects on success and value creation in organizations with identifying, developing and managing the intangible assets. In fact, in order for companies to have a better understanding of the process of creating value and to have better performance, they should go into the intellectual capital measurement and management (Ismail, 2005).

Since, these organizational capitals are not reflected in the balance sheet though they have significant effects on the performance, profitability and innovation; they require attention and resources allocation (Khavanadkar, 2008).

The long-term improvement of performance depends on how the real organizations' capital is, that is the combination of physical and intellectual capital is applied to meet the interests of stakeholders. Assumptions are presented below:

H_4: Internal capital is correlated to organizational performance

H_5: Linkage capital is correlated to organizational performance
H_6: External capital is correlated to organizational performance

Previous research indicates that in today's business challenges, entrepreneurship orientation is considered as an important organizational process that helps organizations to survive and function. Rapidly changing technologies and short cycle life products has forced companies to be innovative and to develop new ideas, products and processes and take risks to cope with rapid changes. Increasing global and local competition has raised the needs of companies to have aggressive competition and being pioneer (Tajeddini, 2010).

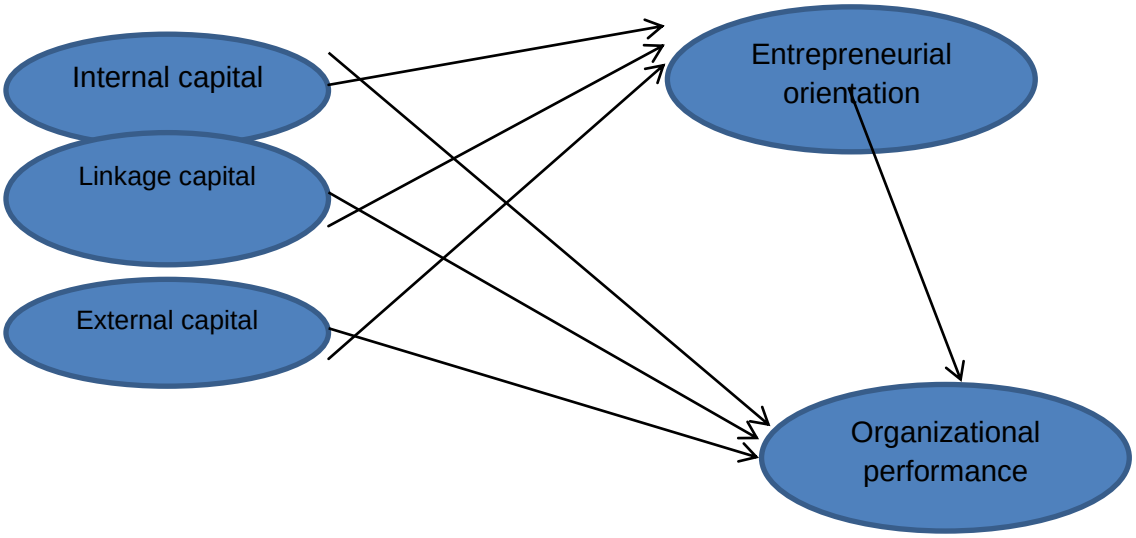
In a competitive business environment, the most successful organizations are those that could identify opportunities and take advantage of them. Companies that have higher entrepreneurial orientation can shape their internal resources to improve their work performance. The last assumption is presented below:

H_7: Entrepreneurial orientation is correlated to organizational performance.

Based on what was discussed, the conceptual model that shows the relationship between dimensions of intellectual capital including human capital, structural capital and relational capital with entrepreneurial orientation and organizational performance is shown in Figure 1. In figure 1, both direct and indirect effect of intellectual capital on organizational performance with the mediating effect of entrepreneurial orientation is shown.

Finally, to assess organizational performance according to the sensitivity of firms to share financial information and archives, and also considering widespread use of subjective indicators of performance in similar studies, Hughes and Morgan model (2007) has been used. Organizational performance, including two dimensions: customer performance yield and product yield. Customer performance includes: the rate of new customer acquisition, customer satisfaction of products and the company's efforts to preserve and maintain existing customers. Product yield also including the company's sales, market share and ability to participate in the new era.

Figure 1: Conceptual Model



Many researchers have investigated the relationship between Intellectual capital, entrepreneurial orientation and organizational performance, but this study provides new insights in linking intellectual capital and organizational performance through the mediating role of entrepreneurial orientation. In the table below, a summary of research conducted in Iran and other countries are mentioned.

Table 1: A Review of Previous Studies

Researchers	year	subject	conclusions
Li, Y-H, Huang, J-W, and Tsai	2009	Investigate the relationship between entrepreneurial orientation and performance mediating role of knowledge creation process	Entrepreneurial orientation positively increases firm performance the But if the process of knowledge creation as a variable Be added to this interface, a direct relationship between entrepreneurial orientation and performance will decrease.
Wu, W-Y., Change, M-L., and Chen, C-W	2008	Investigating the Promotion of innovation with the accumulation of intellectual capital, social capital and entrepreneurial orientation	With the increasing of intellectual capital, Company's innovations would be increased. The results support The mediator's role of intellectual capital and the Moderating effect of social capital and entrepreneurial orientation in connection with the intellectual capital and innovation.
Ngah, R. and Ibrahim, A.R	2009	The relationship between intellectual capital, innovation, organizational function in small and medium companies	Each of the indicators forming the intellectual capital (Including human capital, structural capital and Relationship capital) has positive Significant effect on innovation and performance
Imani poor and zivdar	2010	Relationship to entrepreneurial orientation and company performance (sales representatives in Tehran, Iran Insurance Company)	The results show that there is a positive Significant relationship between entrepreneurial orientation and performance

3. **Methodology**

This study tries to determine the causal relationships between variables of intellectual capital, entrepreneurial orientation and organizational performance. Descriptive - correlational method is used to analyze the data. This research typically, is based on Structural Equation Model (SEM).

3.1. Population, sample and method of sampling

This study used a five-point scale, adapt to Bontis (1999), Rudez & Mihalic (2007) and Moon & kym (2006), to measure Intellectual capital variable. This study was based on

the work of Lumpkin & Dess (1996) and Miller & Friesen (1982), to measure entrepreneurial orientation variable with five dimensions: innovativeness, risk-taking, proactiveness, competitive aggressiveness, and autonomy. In this study, 91 managers of nanotechnology corporations (the approximate number of 422) were selected as a population. The minimum sample size for the study based on sampling from limited population formula with sampling error level of 0.05 is calculated as follows:

$$n = \frac{\frac{z^2 pq}{d^2}}{1 + \frac{1}{N}\left(\frac{z^2 pq}{d^2} - 1\right)}$$

To achieve the desired number of sample, 255 questionnaires were distributed randomly and approximately 211 questionnaires were collected.

3.2. Reliability

To evaluate the reliability of the questionnaire, Cronbach's alpha test was used. As shown in Table 2, the reliability coefficient calculated for each Index is greater than 0.7.

Table 2: Cronbach's Alpha

Total alpha	Organizational performance	entrepreneurial orientation	Intellectual capital	Rational capital	Structural capital	Human capital	variables
53	6	20	27	9	9	9	Number of questions
0.917	0.823	0.870	0.856	0.847	0.846	0.833	Cronbach's alpha

4. Results

In table 3, individual and organizational characteristics of the sample survey are presented.

Table 3: Characteristics of the Sample

Percent	Frequency	Items	characteristics
90.6	183	male	sex
9.4	19	female	
4.4	9	Diploma	Education
7.9	16	Degree	
34.1	69	Bachelor	
38.2	77	Master	
15.4	31	Ph.D.	
12.1	11	Under 4 years	History of activity
49.5	45	4 -8	
24.2	22	8 -12	
14.2	13	12 and higher	
19.8	18	Under 3	Number of products
40.6	37	3 - 5	
26.4	24	5 - 7	
13.2	12	Above 7	

With a look at the patterns of fitness indices measuring intellectual capital, organizational performance and entrepreneurial orientation in the bottom of the tables 4, 5 and 6, we found that all these patterns of fitness are acceptable. Also, the critical values of the coefficients are larger than 2, so all obtained coefficients are significant.

Table 4: Results of Intellectual Capital Measurement Model

(T-value) Critical values	coefficient	Observation variables	Latent variable
9.49	0.66	Competence of staff	Human capital
11.70	0.80	Staff innovation	
11.63	0.80	Staff satisfaction	
11.07	0.75	Organization culture	Structural capital
11.68	0.78	Organizational	
11.22	0.76	Information	
12.09	0.81	Customer satisfaction and loyalty	Rational capital
12.11	0.81	Relationships with business partners	
10.16	0.69	Relationship With other groups and	
RMSEA=0.000. GFI=0.98. AGFI=0.96. NNFI=1.01. RMR=0.014. CFI=1.00			

Table 5: Results of Organizational Performance Measurement Model

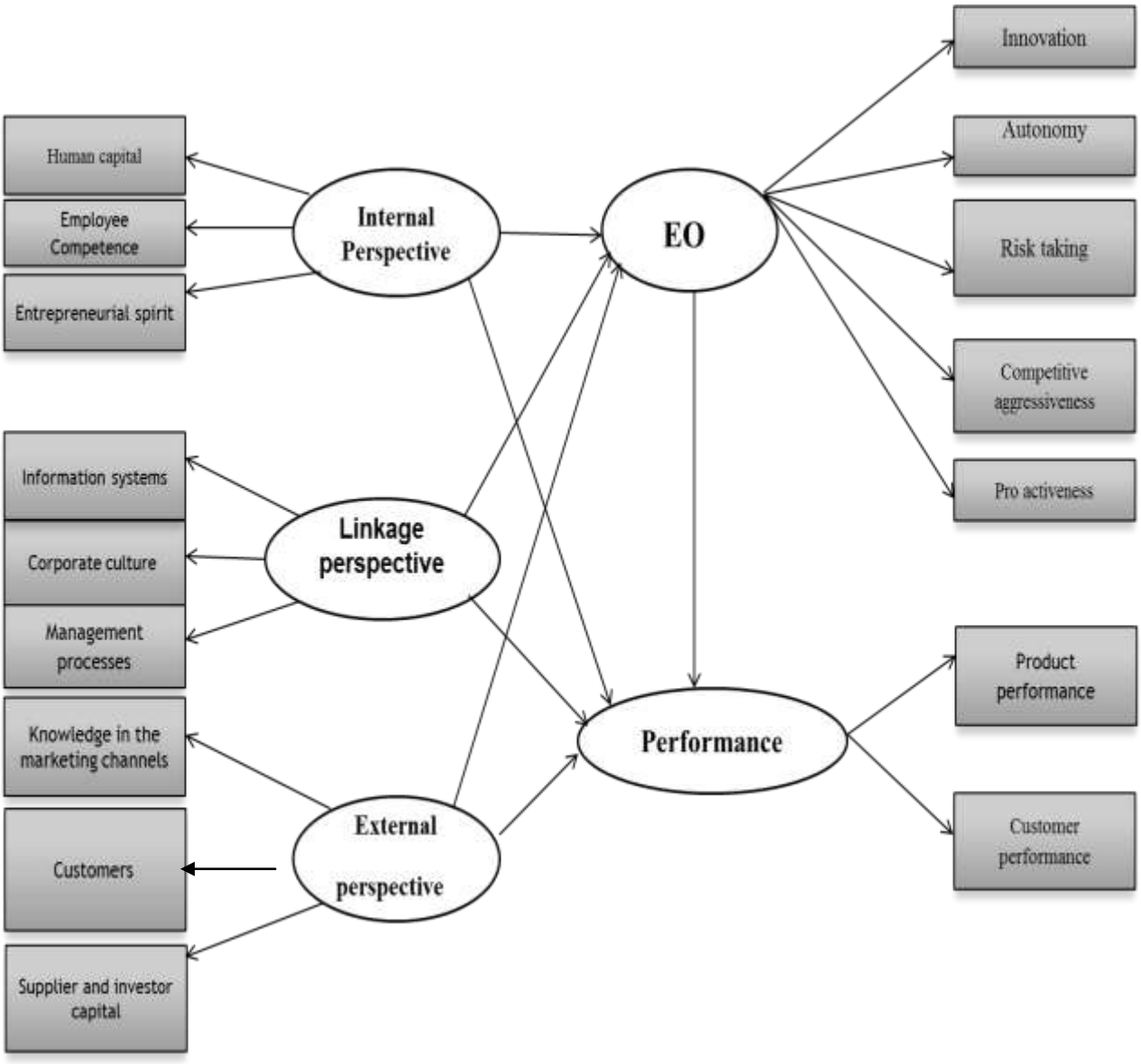
(T-value) Critical values	coefficient	Observation variables	Latent variable
10.78	0.70	Company's sales as compared to other businesses	Product performance
9.57	0.64	The company's share of the market for nanotechnology products in Iran.	
9.55	0.64	Company's ability to offer new products in comparison with other businesses	
9.30	0.63	Uptake of new customers per year	Customer performance
8.67	0.59	Customer satisfaction of products	
8.14	0.55	Trying to keep customers	
RMSEA=0.037, GFI=0.98, AGFI=0.96, NNFI=0.99, RMR=0.023, CFI=0.99			

Table 6: Results of Entrepreneurial Orientation Measurement Model

(T-value) Critical values	coefficient	Observation variables	Latent variable
5.53	0.44	Emphasis on identifying and exploring new needs of customers in the field of nanotechnology products	**Innovation**
7.49	0.59	Encouragement to work with new methods for tasks	
5.52	0.44	Support of employees new ideas of regardless of their job position	
5.28	0.42	Imitation of another corporation from the company's innovation	
9.04	0.75	Employee participation in important decision making leaders	**autonomy**
3.91	0.32	Freedom of employees to solve work problems	
5.64	0.45	Employees access to important information such as product information, sales	
5.02	0.41	Freedom of action to individuals or groups in presenting new ideas	
11.71	0.77	Investment in new markets	**Risk taking**
8.41	0.59	managers tend to invest in venture projects	
9.75	0.67	Identify and exploit opportunities for delivering new products to reveal and conceal	
8.15	0.58	Risk taking as a positive feature for the company	
9.85	0.66	Company efforts to remove competitors	**Competitive aggressiveness**
9.52	0.64	Welcoming the entry into markets with very low price to improve the competitive position	
9.48	0.64	Company's ability to compete with other businesses	
10.32	0.69	Efforts to improve the competitive position through the timely release of new products	
9.92	0.69	Efforts to introduce new products in the market for the first time	**Pro activeness**
7.75	0.56	Managers tend to be an excellent leader in providing ideas and new products	
6.71	0.49	Leadership in identifying new markets	
9.82	0.68	Application of new technology to be pioneer	
RMSEA=0.052, GFI=0.89, AGFI=0.86, NNFI=0.90, RMR=0.039, CFI=0.91			

Path method can be considered as a tool for showing which variables can prompt changes in other variables. Figure 2 shows the critical path method for testing the hypotheses. This diagram includes the relationships between variables that form the overall pattern of research and its hypotheses.
Fitting indexes of the conceptual model (RMSEA=0.036, GFI=0.93, CFI=0.98, AGFI=0.90, NNFI=0.98, RMR=0.017,) indicates a very high fitness of pattern. Table 7 shows the results obtained from the hypotheses testing on relationships between variables of this study.

Figure 2: **Final Model with Linear Structure - The Final Test of the Model**



According to first, second and third hypotheses, it was claimed that the constituent dimensions of intellectual capital affect entrepreneurial orientation. The results presented in Table 8 shows that, all aspects of intellectual capital (human capital, B=0.24، P<0.01), (structural capital, B=0.42، P<0.01), (rational capital, B=0.29، P<0.01) positively affect entrepreneurial orientation.

Table 7: The Results of Tests of Hypotheses

condition ڕەدپش	Hypothesis	(T-value)	Coefficient	variable اوەتسب	variable لقتسم
accept	H1	3.07 **	0.24	**entrepreneurial orientation**	Human capital
accept	H4	2.11*	0.16	**performance**	
accept	H2	4.79**	0.42	**entrepreneurial orientation**	Structure capital
reject	H5	1.29	0.11	**performance**	
accept	H3	3.63**	0.29	**entrepreneurial orientation**	Rational capital
reject	H6	0.63	0.05	**performance**	
accept	H7	3.45**	0.39	**performance**	entrepreneurial orientation

For the fourth, fifth and sixth hypotheses, which were alleged that the constituent dimensions of intellectual capital affect organizational performance. The results presented in Table 7 shows that human capital is the strongest dimension of intellectual capital that directly and significantly affect organizational performance. So, the fourth hypothesis is accepted. However, structural capital (B=0.11) and relation capital (B=0.05) have no significant effect on organizational performance. Thus, the fifth and sixth hypotheses are rejected.

The results show that entrepreneurial orientation (B=0.39، P<0.01) significantly has an effect on organizational performance, so the seventh hypothesis is accepted.

Based on the results of the final model, the standard coefficient for the effect of human capital, structural capital and relational capital on entrepreneurial orientation respectively are (B=0.42، P<0.01), (B=0.42، P<0.01) and (B=0.29، P<0.01), also entrepreneurial orientation affects organizational performance. Therefore, it can be said that human capital, structural capital and relational capital, respectively, with path coefficients (B=0.11, 0.16, 0.09) indirectly have an effect on organizational performance. These findings show that entrepreneurial orientation between dimensions of intellectual capital and organizational performance, acts as a mediating variable.

5. Discussion

The results show that each of the elements of intellectual capital includes human capital, structural capital and relational capital has positive and significant impact on entrepreneurial orientation. It means, paying attention to intellectual capital, increases competencies and capabilities of human resources, acquiring new knowledge, learning and innovation in the organizations. This in turn led to the promotion of entrepreneurial activities in organizations and in comparison with other organizations, will create sustainable organizational advantage. The results showed that among the constituent dimensions of intellectual capital, human capital has the only direct significant impact on organizational performance.

Therefore, businesses in the community survey, with more investment in human capital as one of the most important sources of recreating the organization, would have staffs with high capabilities and competencies and this eventually led to the development of the organizational performance.

The results from the final linear structural model confirm the relations between entrepreneurial orientation and organizational performance. In other words, with more attention to entrepreneurial orientation, organizational performance will improve considerably. The final linear structural model confirms the role of entrepreneurial orientation on moderating the relationship between intellectual capital and organizational performance.

5.1. Suggestions

According to the results of this study in order to develop intellectual capital and entrepreneurial orientation, the following four suggestions are proposed:

a) For strengthening each component of human capital (competency, innovation and employee satisfaction), the authors suggest continuous measurement of the staff competence level including their knowledge, skills and abilities, handling top ideas workshop for using them to participate in the operational process, creating thinking centers for development of new ideas and ideational thinking about new activities.

b) To strengthen each components of structural capital (organizational culture, organizational processes and information technology), the authors suggest the holding of short and long term training teamwork, encouragement of employees and managers to perform activities as a group and working effectively with other, efforts to create a supportive culture through designing reward and incentive systems to reinforce innovation and human resources, re-engineering processes to improve process characteristics (cost, time, quality, etc.) in order to increase value for customers, using information systems in order to simplify access to information and development of computer networks to communicate with customers and other companies.

c) To amplify each component of rational capital (satisfaction and customer loyalty, relationship with business partners, and partners with other groups) the authors suggest on communication with customers and to continuously get information on their satisfaction level, the need to create customer management system, increase the presentation in domestic and international scientific conferences related to the activity areas in order to exchange information with experts and reputable companies.

d) For the growth of entrepreneurial orientation, the following suggestions are offered: designing risky projects and financial support for these projects, organization creative skills training workshops for employees to exchange ideas, investment on market research and marketing, investment in research and development and identification of opportunities for creating new ideas.

5.2. Recommendations for further studies

- Implementation of similar research projects in the area of business and service industries can play complementary role for this study.
- Since, in this study, a questionnaire was used for data collection, it is recommended to other researchers to use interviews and other data collection methods in order to achieve reliable results.
- Because data were collected in a short period of time, other researchers are recommended to study in a longer review period and compare the results.

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