



## The Effect of Intellectual Capital on Organizational Innovation (Case Study: Technology and Science Park in Semnan Province)

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**ABSTRACT:** This study tries to survey the effect of different components of intellectual capital on organizational innovation in Technology and Science Park in Semnan province. For doing it, needed information was extracted statistical population. Two standard questionnaires about intellectual capital and organizational innovation were used to collect research data. These questionnaires were translated on original version of Research Company of intellectual capital. Statistical descriptive and inferential topics were used to analyze the data. Descriptive statistics consist of frequency tables, means and standard deviation and inferential statistics used structural equations such as confirmatory factor analysis and path analysis. According to the results of statistical analysis, there is a significant relationship between intellectual capital components including customer capital and human capital with innovation. But there is not a significant relationship between structural capital and innovation .

**Keywords:** Intellectual Capital, Innovation

### INTRODUCTION

Entering to knowledge economic, knowledge finds more priority in comparison with other factors such as land, capital and machineries, so that in this economic, knowledge is considered as the most important factor in production and the most important competitive advantage of organizations<sup>1</sup>. It should be note that a much part of properties in organizations are intangible properties and accounting methods cannot measure those<sup>2</sup>. On the other hand, knowledge is identified as the most important alternative capital of physical and financial capitals<sup>3</sup>. Knowledge – oriented business setting needs to an approach which encompasses new organizational intangible properties including knowledge and competencies of human resources, innovation, customer's relations, organizational culture, systems, organizational structure and so on. Among this, intellectual capital has been paid ever increasingly attention among academic researchers and organizational practitioners<sup>4</sup>.

It should be noted that in present knowledge – oriented economic, intellectual capital is encompassed important part of company value. Ability to managing and controlling intellectual capital is required that companies can report, measure and identify their intellectual capital<sup>5</sup>.

**The goal of this study is surveying following topic:**

Is there a significant relationship between intellectual capital and innovation in Technology and Science Park in Semnan province? How much is intensity between relationships? Which element of intellectual capital has more significant relationship?

**Conceptual Model of Research**

Studying the effect of dimensions of intellectual capital on organizational innovation in Technology and Science Park in Semnan province, researcher has used mostly classification model of intellectual capital which is one of the components of balanced score card of intellectual capital. According to the model, researcher has surveyed relationships between dependent and independent variables. Accordingly, relationship among three components of intellectual capital (human capital, structural capital, customer capital) is identified with different views toward organizational innovation by researcher.

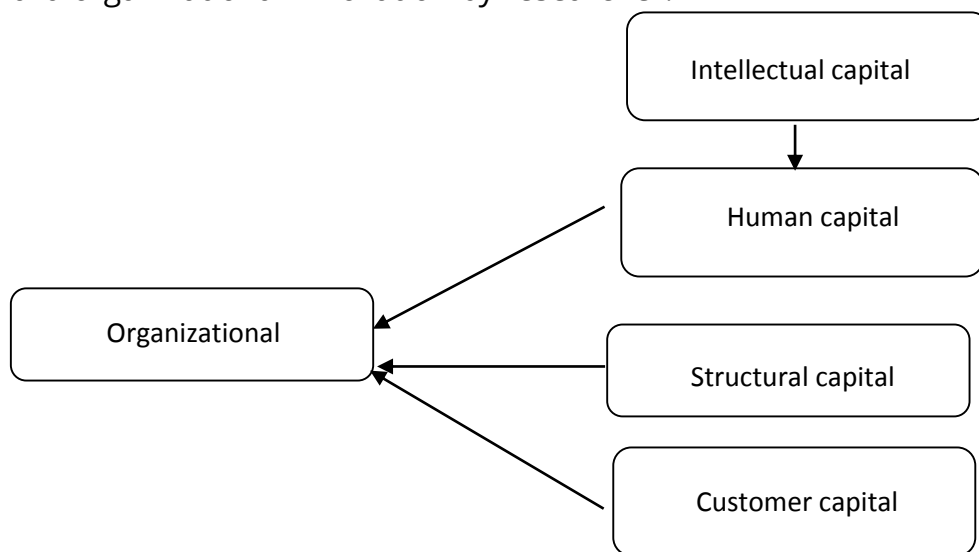


Fig 1. Conceptual model of study

**Research Background**

Ahmad Al-Dujaili studied 32 employees in automotive industry and textile in Iraq, entitled the effect of intellectual capital on organizational innovation and concluded that human capital and structural capital have significant positive impact on organizational innovation, while there is not significant relationship between customer capital and organizational innovation<sup>6</sup>.

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Delgado et al. studied the effect of knowledge properties on innovation. They confirmed significant positive impacts of knowledge properties (intellectual capital) on innovation capabilities in their study entitled "knowledge properties of organization and innovation capabilities" (evidence of Spain manufacturing companies)<sup>7</sup>.

Cheng et al. considered the effect of structural capital dimensions () on organizational innovation in some under – studied companies in his study entitled the effect of intellectual capital on organizational innovation. The results showed that human and structural capitals are influential on organizational innovation and customer capital has not any impact on it. He concluded that its reason is weakness of companies in general communication with suppliers, customers and organizational partners<sup>8</sup>.

### MATREALS AND METHODS

From goal point of view, this study is an applied study and it is considered as a descriptive study with respect to collecting data. Path analysis was used to test the existence of relationship between variables and being significant of estimated models.

#### Research Hypotheses

• **Main hypothesis:** There is a significant positive relationship between intellectual capital and innovation in Technology and Science Park in Semnan province.

#### • Sub-hypotheses

1. There is a significant positive relationship between human capital and innovation in Technology and Science Park .

2. There is a significant positive relationship between structural capital and innovation in Technology and Science Park.

3. There is a significant positive relationship between customer capital and innovation in Technology and Science Park.

### RESULTS

**Testing univariate normal condition:** Kolmogorov – Simirnov test was used to show under – studied variables have normal condition or not. The results indicated that the variables have normal distribution. In this test, H0 means that the variables have normal distribution.

**Table 1.** Normal distribution of variables by using Kolmogorov – Simirnov test

Hidden variables of model	Z value	Sig.
innovation	1.16	0.135
Customer capital	1.30	0.069
Human capital	1.05	0.222
Structural capital	0.84	0.480

As regard all significant levels are more than 0.05, so  $H_0$  is accepted based on normal distribution. So normal conditions of under – studies variables are reliable for calculating unknown parameters.

**Structural Model (Path Analysis Model) by Using AMOS**

**Hypothesis 1:** there is a significant positive relationship between customer capital and innovation in Technology and Science Park.

According estimated research model, coefficient of path analysis of customer capital with innovation in Technology and Science Park has been estimated 0.27. Amount of significance level for this parameter (based on error rule of 5% for refusing  $H_0$  for amounts higher than 1.96 in any parameter) has been calculated lower than 0.05 (sig=0.012). So there is enough reason for rejecting null hypothesis. According to significance of this coefficient, it can be noted that there is statistically a significant relationship between customer capital and innovation in Technology and Science Park.

**Hypothesis 2:** there is a significant positive relationship between structural capital and innovation in Technology and Science Park.

According estimated research model, coefficient of path analysis of structural capital with innovation in Technology and Science Park has been calculated 0.01. Amount of significance level for this parameter (based on error rule of 5% for refusing  $H_0$  for amounts higher than 1.96 in any parameter) has been calculated lower than 0.05 (sig=0.012). So there is enough reason for rejecting null hypothesis. According to significance of this coefficient, it can be noted that there is not statistically a significant relationship between structural capital and innovation in Technology and Science Park.

**Hypothesis 3:** **Hypothesis 1:** there is a significant positive relationship between human capital and innovation in Technology and Science Park.

According estimated research model, coefficient of path analysis of structural capital with innovation in Technology and Science Park has been calculated – 0.40. Amount of significance level for this parameter (based on error rule of 5% for refusing  $H_0$  for amounts higher than 1.96 in any parameter) has been calculated lower than 0.05 (sig=0.019). So there is enough reason for rejecting null hypothesis. According to significance of this coefficient, it can be noted that there is statistically a significant relationship between human capital and innovation in Technology and Science Park. T-test was used to consider the effect of demographic variables.

According to below table which has been compared two groups of males and females, it can be seen that all variables in two groups have significant difference, excluding innovation variable. According to mean of groups, it can be seen that males have higher mean than females in all variables.

**Table2.** The effect of demographic variables on research variables – gender

Variable	Gender	N	Mean	SD	Leven test		T value		
					F	Sig.	T	Df	Sig.

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<b>innovation</b>	Male	106	3.63	0.34	1.57	0.212	0.29	186	0.770
	Female	82	3.61	0.30					
<b>Customer capital</b>	Male	106	4.70	0.95	312.70	0.000	5.23	148	0.000
	Female	82	4.16	0.40					
<b>Human capital</b>	Male	106	4.19	0.37	0.00	0967	5.95	186	0.000
	Female	82	3.86	0.37					
<b>Structural capital</b>	Male	106	4.16	0.52	92.87	0.000	4.15	160	0.000
	Female	82	3.92	0.26					
<b>Intellectual capital</b>	Male	106	4.30	0.53	74.45	0.000	5.53	177	0.000
	Female	82	3.96	0.32					

## DISCUSSION

The main goal of present research is surveying the effect of intellectual capital and its dimensions on organizational innovation. The results showed that there is a relationship between three dimensions of intellectual capital, human capital and communicative capital or customer capital, but there is not a significant relationship between structural capital and innovation. In another words, with increasing customer capital and human capital, dimensions of organizational innovation partly will be executed. In fact, it can be said that when human capital and customer capital increase, they will be more innovative. But there is not a significant relationship between structural capital and innovation based on statistical analyses. Since intellectual capital is a multi-dimension phenomenon, so when value is made that the components of intellectual capital influence mutually on each other. Management of intellectual capital provides proper opportunity for organizations and companies which by that, top management can increase organization or company value. The results show that Technology and Science Park in Semnan province could properly not connect between intellectual capital and innovation in organization, since there is not a significant relationship between intellectual capital and innovation. The organization of Technology and Science Park of Semnan province should review specifically its instructions and structures and provide needed ground and structure for growing innovation and idea. In other words, the dimensions of intellectual capital, especially customer capital and human capital must share efficiently information and the control of information change and persuade employees to participation and cooperation to each other and creating competitive advantage and new opportunities of learning, in turn it facilitates innovation in organization. So the organizations have high level of intellectual capital, they facilitate organizational innovation by inducing new ideas and knowledge and the increase of the ability to understand and apply them.

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