

Studying the Effects of Organizational Structures Dimensions on the Intellectual Capital and its Components (Employees of University of Isfahan as Case Study)

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Abstract: Intellectual capital characterized as one of the most important organizational assets. Because in the nowadays world organizational abilities are based on intellectual capitals. Therefore it is necessary to provide and improve intellectual capital in current organizations especially in the educational institutes such as universities. Therefore the purpose of this article is to study the effects of organizational structures dimensions on intellectual capital and its components. Based on the literature review, dimensions of organizational structure include formality, complexity, and concentration and also components of intellectual include human, structural, and relational capital. The statistical population of this study was the employees of University of Isfahan in 2011. In order to calculate sample size, first a primary sampling has been done and then its variance placed in the formula of sampling from limited population and its size has been determined 135. In order to choose sample members, simple classified sampling method has been used. In order to collect data, the questionnaire has been used. In order to analyzing data and concluding results the descriptive statistic and inferential statistic has been used. The Kolmogorov- Smirnov, approval exploratory analysis, Pearson correlation, and simple linear regression have been used to analyzing hypotheses by SPSS18 and Amos graphic 18. The results of data analysis indicated that all dimensions of organizational structure influenced the intellectual capital and its components. The results indicated that formality had significant negative impact on human capital and also had significant positive impact on intellectual capital; but the concentration had significant negative impact on human capital and structural capital; finally the complexity only had significant negative impact on the human capital. Finally some empirical suggestions have been offered for the human resources managers to designing suitable organizational structure in order to increasing and improving intellectual capital in the organizations.

Key words: Organizational structure, Intellectual capital, Human capital, University of Isfahan

INTRODUCTION

During the later decade the literature of management concentrated on the role of intellectual capital in the nowadays organizations. So that it is considered as one of the strategic sustainable sources in order to acquiring and attaining competitive advantage (Drucker, 1985; Grant, 1991). Because in the age of knowledge, the intellectual capital considered as one of the important organizational assets (Amiri *et al.*, 2010). Based on this, it has been characterized as the pulse of organizational capabilities. Based on the strategic view, the intellectual capital leads to creating and increasing organizational values (Chen *et al.*, 2004). The previous studies indicated that organizational structure could influence organization through intellectual capitals (Wange *et al.*, 2003). Therefore it is seemed necessary to studying and examining the different impact of organizational structure on intellectual capital management. Also in the fundamental organizations such as universities that educate the future-maker personals, selecting suitable structure by their managers leads to acquiring universities' goals and purposes. Universities as fundamental organizations that being face with different environment than past, because of different educational and research functions that they have. Therefore it is necessary that organizations such as universities select appropriate structure to increasing knowledge processes, sharing them and also increasing intellectual capitals. In order to this, current study was aimed to studying impact of organizational structures' dimensions on the components of intellectual capital with the purpose of helping organizations in selecting the best and effective organizational structures that help them to attaining, using, and recognizing the strengths and weakness of their organizational structure.

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Intellectual Capital:

Though economical capital from knowledge assets such as intellectual capital and its beneficial implications has been recognize as formally (Ergenly *et al.*, 2007), but in this study emphasis is on relatively new relations. The concept of intellectual capital introduced by John Kenneth Galbraith in the 1969. Also Peter Drucker introduced the concept of knowledge personals before John Kenneth Galbraith (Fiewal, 175). Managing intellectual capital has been characterized as one of the basic and fundamental functions of organizations. However this function is difficult to perform because of some complex problems such as recognition and measurement of intellectual capital and its strategic evaluation. Many different frameworks has been offered to classification of different elements of intellectual capital and also creating set of metrics to measuring it (Bartesh, 2005). But we derived three basic dimensions of intellectual capital based on studying different researches. These dimensions include human capital, structural capital, and relational capital.

Human Capital: this dimension refers to individual and tacit knowledge that placed the minds of workers (Bartesh, 2005). Human capital as the fundamental source of innovation is important to revival of the organizations’ strategic advantages. Therefore the organizations could use them to realizing and creating values in the nowadays knowledge-based economic. On the other words the human capital defined as combination of personals’ attitudes, creativities, and capabilities.

Structural Capital: this dimension deals with organizational system and structure. Organizations provide favorable conditions to utilizing human resources through the powerful structural capital, helping human resources to acquiring their potentials, and also leading them to reinforce and increase innovation and creativity (Lopez, 2008). Some of the structural capitals’ measures include organizational culture, organizational structure, organizational learning, operational processes, and informational systems.

Relational Capital: this dimension is a fundamental peace of intellectual capital that originates from marketing relations and channels. The relational capital refers to educated knowledge from the organizations relationship with its environment including customers, suppliers, and scientific centers. The relational capital has impact on organizational values than structural and human capitals (Choi, 2003). The relational capital includes three dimensions: marketing fundamental capabilities, market intensity, and customers’ loyalty. All of these dimensions and their relations with each other have been indicated in the fig 1.

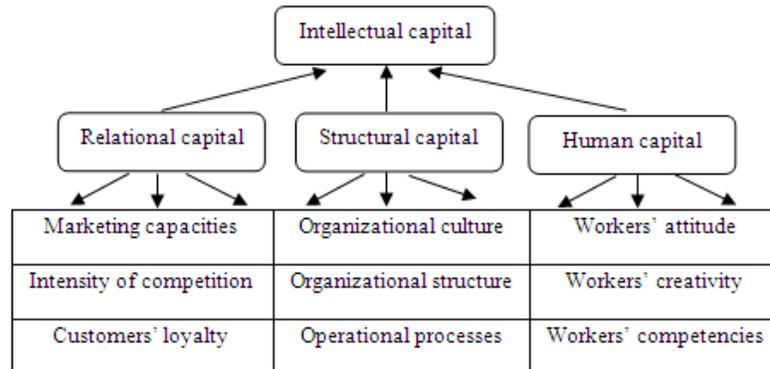


Fig 1: Dimensions of intellectual capitals and their sub-dimensions

Organizational Structure and Its Dimensions:

The effective organizational structure should able to facilitate relationships among the different departments in the organizations and also leads to efficiency and effectiveness of organizational units. The traditional perception of organizational structure leads that organization unable in affront of new needs and challenges and also unable to improving intellectual capital. The organizations should support flexibility of the organizational recipes when facing internal and external environments. Also in order to acquiring needed flexibility and implementing creativity they should authorize the workers to apply individual skills in performing their job functions. When the organizations being bigger, their managers advance the chains of rules for the processes of control, therefore the flexibility debilitated; and in order to attaining stability, the creativity exploited from the organizations and the result was stopping innovation and removing constructive conflict, because in such cases some resources such as money and financial sources spend to controlling systems. Therefore the organizational structure should incrementally change and could adapt them with changes and use the existing advantages and opportunities. The organizational structure is the model and plan of communications and interactions among the organizations’ units and departments (Cyert & March, 2007). Because of the diversity and span of studies in the areas of structure studies that derived from the history of this concept, studying all dimensions of it is time-consuming processes. Based on this, Robins’ research about the dimensions

of structure that including three dimensions as formality, complexity, and concentration has been used in our study (Robins, 2002). These dimensions have been described in the following section:

Complexity: this dimension refers to degree that severance exists in the organization (Child, 2008). Generally the concept of complexity refers to the number of job titles (dispersal of occupation in the organizations), the number of hierarches and organizational levels, educational levels and geographical dispersal of organizational departments from each other (Gresov&Drazin, 2007).

Formality: this dimension refers to degree that organizational occupations are standardized (Robins, 2002: 93). Generally the formality refers to the degree of development and documentation of rules, laws, recipes, regulations, job descriptions, and duties that exist in the organizations (Gresov&Drazin, 2007).

Concentration: the third dimension of organizational structure is concentration. Many of theorists believed that concentration refers to degree that the decisions made in the specified level (Child, 2008: 28). Also this dimension refers to the degree of independency of an occupation that have in decision making and selecting. Some of the subsets of decision making that could create concentrated range including appointing plans, designing facilities, attracting resources, awarding, recruitment and exclusion, performance appraisal, promotion, adjusting and devoting budget, accessing information, and controlling processes (Meyham and *et al.*, 2010). Therefore based on the literature of subject the first hypothesis derived as follow:

H₁: Organizational structure influences intellectual capital.

Organizational structure and Human Capital:

The concept of human capital refers to the tacit or explicit knowledge that peoples have and also ability to create it. Also this ability is important for the organization and includes values, attitudes, capabilities, and individuals' knowledge. Powell Loraine (2002) indicated that organic structures provide good situations to empowering workers because of its flexibility characteristics, dynamics, attending to specialty and competency, and supporting workers' creativities (Powell Loraine, 2002). As much as the workers are flexible in performing their job functions and organizational functions and have more independency in their job then, they acquire boldness of thought and action (unlike the usual and documented rules) and then the organizations are able to using their workers' productivity more and more. If there is formality and concentration in the authority of decision making then offering the creative solutions decrease. While distribution of authority in organizations leads to spontaneity, experience- orientation, and freedom of speech. These are the factors that create infrastructures of workers' competency (Gold, 2001). Therefore based on the mentioned theoretical framework, we can derive the related hypothesis as following.

H₂: Organizational structure influences human capital.

H_{2.1}: Formality influences intellectual capital.

H_{2.2}: Concentration influences intellectual capital.

H_{2.3}: Complexity influences intellectual capital.

Organizational Structure and Structural capital:

Human resource managers should recognize and examine structural obstacles in order to utilizing organizational resources and competencies, empowering human resources to recognizing opportunities, offering new combination of current resources, and finally creating infrastructures of organizations' structural capitals. Often the organizational structure directs the type of organizations' work. Therefore the organizational structure should exist so that could satisfy the needs of organization (Daft, 1998). Also organizational structure related to organizational culture and these related to each other. The organizational structure participates in shaping organizational culture. The organizational structure coordinates organizational activities and goals and provides discipline to acquiring organizational goals. This also determines that who should place where, communicate with whom, utilize what rules and methods that organization could achieve to its goals (Ramezan, 2001). Therefore the organizational structure has many important roles in the quality of organizations' formal and informal communications, and the purpose of these communications was to participating in information and transferring information in the organizations. Because information is the organizations' staff of life. If this doesn't provided for the organization timely leads to organization stricken to bewilderment and uncertainly. Based on the mentioned theoretical literature the hypotheses derive as following.

H₃: Organizational structure influences the structural capital.

H_{3.1}: Formality influences the structural capital.

H_{3.2}: Concentration influences the structural capital.

H_{3.3}: Complexity influences the structural capital.

Organizational Structure and Relational Capital:

Organization is a social character that is based on purpose, includes coordinated and active systems, have relationship with external environment, and its structure designed intentionally. The organizational structure should is such that workers could learn to communicating with internal and external environment through it,

such as the customers, suppliers, and scientific institutes. The organizational structure should be able to offer a framework to responsibilities and internal and external communications and communicate the basic pillars of the organizations. The organizational structure should integrate organization as a collection to coordinating all internal activities. Extremely segmentation of organization leads to debilitating interactions between teams and is an obstacle to integrating knowledge resources. Concentrated authority and control leads that managers empower their workers to active participation in managing organization and promoting the culture of openness and relying on each other. The flexibility of rules, more informality, downward and upward communications leads to advancing management and includes managing workers, technologies, knowledge, and processes, and also supports the workers' interactions and organizational communications with external environment. Based on this, the hypotheses derive as follow:

- H₄**: Organizational structure influence relational capitals.
- H_{4.1}**: Formality influence relational capitals.
- H_{4.2}**: Concentration influence relational capitals.
- H_{4.3}**: Complexity influence relational capitals.

Research Methodology:

This article was aimed to studying organizational structures' dimensions on the components of intellectual capital. Based on the purpose, this study was descriptive survey, was applied based on methodology, was sectional based on time, and was quantity research based on the type of data. The statistical population of this study was the personals of the University of Isfahan in 2012. In order to calculating the sample size, first a primary sampling has been done and its variance has been placed in the formula of sampling from limited population and finally the sample size has been determined 135. The method of sampling members was the simple classified sampling method. In order to collecting data the questionnaire has been used. These questionnaires have being formed of two sections. The first that was formed to organizational structure including formality, concentration, and complexity, and the second was about intellectual capital that includes three dimensions as human, structural, and relational capital. The reliability of the questionnaires has been examined through content reliability and their stability has been calculated through Cronbachs' Alpha that the results of it have been indicated at the table 1. In order to analyzing data and concluding results, the descriptive statistic and inferential statistic has been utilized. The Kolmogorov- Smirnov, approval exploratory analysis, Pearson correlation, and simple linear regression have been utilized in the SPSS18 and Amos graph 18.

Table 1: the results of Cronbachs' Alpha

variables	Intellectual capital			Organizational structure			Mean of all variables
	Human capital	Structural capital	Relational capital	formality	concentration	complexity	
Cronbachs' Alpha	80.1%	75%	68.8%	74.2%	69.1%	70.4%	81.5%
	76%			85.6%			

Findings And Results:

In this section first the demographic characteristics of sample members have been offered. These characteristics include age, sexuality, job experiences, and educational level. These indicated at the table 2.

Table 2: Sample members' demographic characteristics

variables	distribution	frequency	Percent
sexuality	Male	45	33.3%
	female	90	66.7%
age	Less than 25	11	8.1%
	25-33	51	37.8%
	33-41	39	28.9%
	41-55	13	9.6%
	More than 55	21	15.6%
Educational levels	Less than diploma	26	19.2%
	BA	84	62.2%
	MA	25	18.6%
Job experiences	Less than 10	82	60.7%
	10-20	33	24.4%
	20-30	20	14.8%

In this section in order to determining role and station of each of the intellectual capital dimensions and also situation of each of the organizational structures' dimensions, method of approval factor analysis has been used. Also in order to examining the relationships between intellectual capital and its dimensions with organizational structure and its dimensions, correlation coefficient test has been used, and in order to

determining impact of organizational structures' dimensions on intellectual capital, simple linear regression has been used. All of this mentioned methods done in the Amos graphic18.

Model of Structural Equation:

In order to better and accurate examining the research hypotheses and also implementing approval factor analysis, the structural equation modeling (AEM) has been used. The method of SEM has been used to resulting that are the applied constructs in the research valid, and also are the experimental data support our researches' model. Based on the output of Amos graphic some reforms were necessary that the suitability measures be acceptable. Therefore based on the suggestions of Amos graphic some little reforms done in the model. As indicated in the fig1 the 13th and 14th questions removed because of their load factor (less than 0.4). In order to testing and examining fitness and goodness of the models, all of the valid measures have been used. The reformed models have been shown in the fig 2, 3.

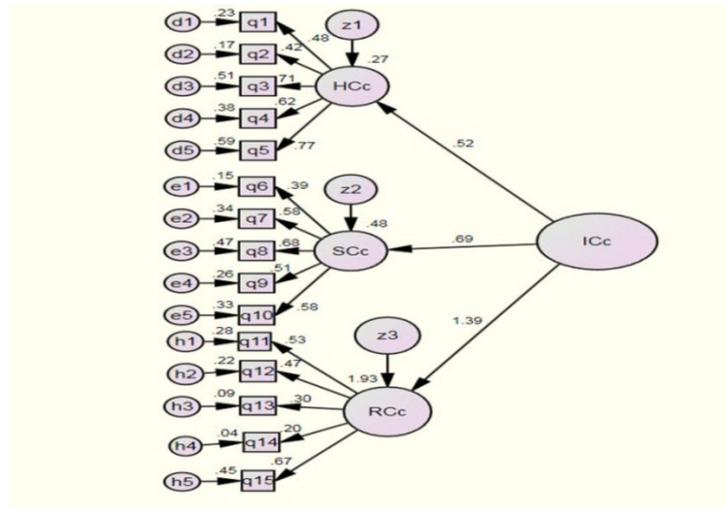


Fig. 2: Measurement model of intellectual capital

Based on the fig 2, the load factor of the all questions except 6th, 13th, and 14th questions with 0.39, 0.30, and 0.20 load factors were acceptable (more than 0.4). Therefore 6th, 13th, and 14th questions were removed in next analysis.

Table 3: the property measures to the measuring model of intellectual capital

Measures	χ^2	CFI	TLI	IFI	RFI	NFI	GFI	AGFI	RMSEA
Model	4.534	0.999	0.998	0.999	0.985	0.994	0.990	0.963	0.027

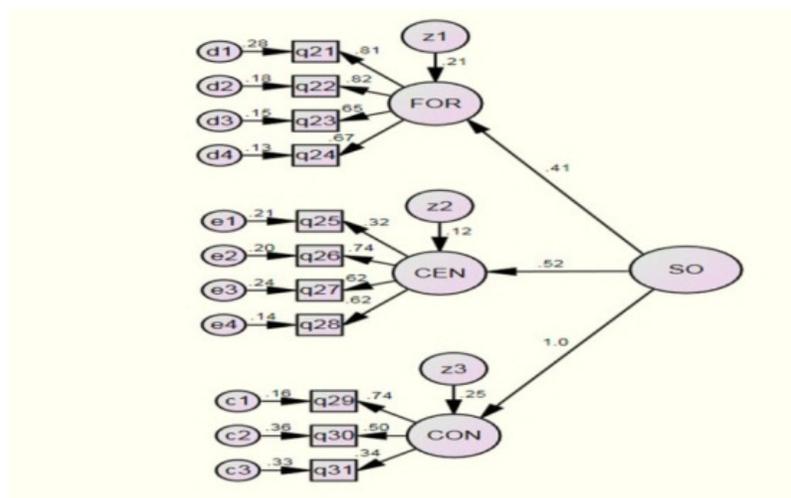


Fig. 4: Measurement model of intellectual capital

Based on the fig 3, all of questions had acceptable load factor except 31th question with 0.34 load factor in this model, and then this question removed from model in the next analysis that the results could better explain relations among variables.

Table 4:The property measures to the measuring model of organizational structure

Measures	χ^2	CFI	TLI	IFI	RFI	NFI	GFI	AGFI	RMSEA
Model	63.54	0.90	0.88	0.92	0.59	0.676	0.85	0.78	0.059

It is should remembered about the different goodness measures of model that χ^2 is one of the best valid and general measures to examining goodness, has been used in this model. If the sig level of this measure is more (sig >0.05) indicate approve of the model and this result is true about all of three model. The value of FRI, IFI, TLI, CFI, NFI was between 0.9-0.95 indicate the good fitness of model and more than 0.95 values indicated that the data had good and acceptable fitness. In these models this measure indicates that the data had good fitness. If the value of measures of GFI and AGFI is near to 1 indicates that the data had good fitness and this values was true in the model of our research. Also RMSEA is one of the prevalent measures that in the most researches used to examining goodness of the model. In order to this the value of this measure should is near 0.05.

Examining Hypotheses:

In order to analyzing hypotheses, first the Kolmogorove-smirnov test has been used to examining that our researches' variables are normal. As shown at the table 5, the results of one way Kolmogorove-smirnov test indicated that all of researches' variables had normal distribution.

Table 5: Results of Kolmogorove-smirnov test

Statistics Variables	Frequency	mean	Standard deviation	Z	sig
Human capital	135	3.28	0.64	0.846	0.471
Structural capital	135	3.2	0.64	0.815	0.52
Relational capital	135	3.4	0.58	1.248	0.089
Formality	135	2.86	0.75	1.034	0.236
Concentration	135	2.75	0.68	0.981	0.290
Complexity	135	3.08	0.66	0.290	0.283

Then the method of correlation coefficient test has been used to measuring correlation among variables. The results of this test indicated that much of studied variables had relationships with each other with 99% confidence. Also studying relationship between demographic variables (educational levels and job experiences) with the studied variables indicated that correlation between them doesn't significant even with 95% confidence. Therefore the impact of demographic variables on the researches' variables removed from analysis. The results of correlation coefficient have been offered at the table 6.

Table 6: Results of correlation coefficient

Statistics Variables	Human capital	Structural capital	Relational capital	Formality	Concentration	Complexity
Human capital	1					
Structural capital	0.291*	1				
Relational capital	0.468**	0.596**	1			
Formality	-0.18**	-0.36**	0.62**	1		
Concentration	- 0.17*	-0.44**	- 0.214*	0.363*	1	
Complexity	0.47**	0.035**	0.35**	0.171*	0.177*	1

Existing relationship between dependent and independent variables is prerequisite not sufficient condition; therefore in order to examining impact of independent variables on the dependent variables, the method of simple linear regression has been used. The results of this method offered at the table 7.

Table 7: Results of simple linear regression

Variables	T-test		Human capital	Structural capital	Relational capital	Intellectual capital
	F-test					
Organizational structure	T-test	T	3.34	3.304	6.896	7.834
		T	3.463	3.418	5.354	41.61
		β	0.304	0.300	0.442	0.968
	F-test	F	11.993	11.67	28.660	1732.179
		sig	0.001	0.001	0.000	0.000
		Linear relation	yes	yes	yes	yes

As indicated at the table 7 and based in the results of analysis of variance, the organizational structure had linear relationship with all dimensions of intellectual capital, because its sig is less than 0.05 and the results of T-test indicated that organizational structure had impact intellectual capital and its dimensions. Therefore organizational structure positively influenced the three dimensions of intellectual capital, and based on the value of β , degree of its impact on relational capital was more than other two dimensions. Therefore all hypotheses accepted.

Table 8: Results of simple linear regression between formality and intellectual capital

Variables	T-test		Human capital	Structural capital	Relational capital
	F-test				
Formality	T-test	T	9.030	9.256	1.21
		T	-2.433	2.05	-1.27
		β	0.219	0.185	-0.096
	F-test	F	4.114	4.203	1.286
		sig	0.045	0.043	0.259
		Linear relation	Yes	Yes	No

Based on the table 8 and the results of analysis of variance, the formality had linear relationship with structural capital and human capital, but the relationship between the formality with relational capital and then based on the results of T test, the formality influenced human and structural capitals negatively. Therefore the H4-1 rejected and H3-1 and H2-1 accepted. The results of these methods have been indicated at the table 8.

Table 9: Results of simple linear regression between concentration and intellectual capital

Variables	T-test		Human capital	Structural capital	Relational capital
	F-test				
Concentration	T-test	T(Constant)	6.122	16.090	2.182
		T	-7.05	-3.133	1.640
		β	-0.544	-0.277	0.087
	F-test	F	49.709	9.817	0.661
		sig	0.000	0.002	0.418
		Linear relation	Yes	No	No

As shown at the table 9 the results of analysis of variance indicated that concentration had linear relation with human and structural capitals, but the linear relationship between concentration with relational capital rejected. Finally the H2-2 and H3-2 accepted and H4-3 rejected.

Table 10: The results of simple linear regression between complexity and intellectual capital

Variables	T-test		Human capital	Structural capital	Relational capital
	F-test				
Concentration	T-test	T	9.062	7.355	3.301
		T	-2.70	0.221	-0.055
		β	-0.214	0.027	0.007
	F-test	F	7.291	0.49	0.003
		sig	0.000	0.826	0.956
		Linear relation	Yes	No	No

As the table 10 indicated there isn't significant relationship between complexity with structural capital and relational capital and the results of analysis of variance indicated that the complexity negatively influenced. Therefore H4-1 accepted and H4-2 and H4-3 rejected.

Conclusion And Emperical Suggestions:

The intellectual capital considered as one of the most important organizational assets. Because in the nowadays world organizational abilities is based on intellectual capitals. Therefore it is necessary to providing and improving intellectual capital in the current organizations especially in the universities. The purpose of this article was to studying impact of the dimensions of organizational structure on the components of intellectual capital. Dimensions of organizational structure include formality, complexity, and concentration. Then the components of intellectual capital have been supposed as human, structural, and relational capital. The statistical population of this study was the personals of the University of Isfahan. In order to calculating the sample size, first a primary sampling has been done and then its variance has been placed in the formula of sampling from limited population and its size has been determined 135. The method of sampling members was the simple classified sampling method. In order to collecting data the questionnaire has been used. In order to analyzing data and concluding results the descriptive statistic and inferential statistic has been used. The Kolmogorov-Smirnov, approval exploratory analysis, Pearson correlation, and simple linear regression have been used in the SPSS18 and Amos graphic 18. The results of data analysis indicated that all dimensions of organizational structure influenced the intellectual capital and its components. The results indicated that formality had significant negative impact on human capital and also had significant positive impact on intellectual capital; but the concentration had significant negative impact on human capital and structural capital; finally the complexity only had significant negative impact on the human capital. as the results indicated the organizational structure influenced the intellectual capital, based on this findings it is suggested that the human resource managers in the university of Isfahan and other organizations attend to organizational structure and its designing because if it is designed suitably leads to increasing and improving the intellectual capital of university of Isfahan. The results about the impact of formality on the dimensions of intellectual capital indicated that the formality couldn't influence relational capital but it influenced the structural and human capitals negatively in the University of Isfahan, so it is resulted that if the formality increased in the organization then their workers creativity and innovation decreased and also it is an obstacle to creating integrated organizational culture and debilitating horizontal communications in the organization. Therefore it is recommended that knowledge-based organizations such universities should remove the obstacles of organizational formality limitations and provide the total perceptual framework that derived from organizational entity and reliability. This leads that the workers acquire their needed information easily without the structure of formal control prevent them. In order to this, the informal communications have many important roles in removing organizational formality. About the impact of concentration on the dimensions of intellectual capital, the results of linear regression indicated that concentration hadn't linear relationship with relational capital, but it had significant linear relationship with structural and human capital and negatively influenced human and structural capitals. As mentioned in the previous sections concentration refers to degree that the decisions made in the concentrated level. Decentralization of the authority and control leads that managers empower their workers to active participation in the organizational management and promoting the culture of openness and trust. Therefore it is recommended that the authority and control distributed in the organizations. In the knowledge-based organizations such as universities most of information-based power and control and the managers could decrease these authority and control in the high levels of organizations through decreasing operational levels. Because the informational load could decreased in the organizations through this and is the other way to creating independent function. Creating tasks and functions that not related to each other is one of the other methods to decreasing information processing and then power and control. In this method the organizational units have all needed resources to performing their tasks. Finally about the impact of complexity on intellectual capital, the results of linear regression indicated that the complexity hadn't significant relationship with relational and structural capital but had significant negative relationship with human capital and it negatively influenced the human capital. As mentioned in previous sections the complexity exists in three levels as horizontal, vertical, and geographical. This means that if the complexity exists in the as horizontal, vertical, and geographical levels then organizational communications isformalities, and then possibility of group interactions strongly decrease and this leads to decreasing workers' creativity and competency and prevent the growth of human capitals. Designing organizational structure is one of the serious responsibilities of management and this leads to success or failure of organizations. The managers especially in the scientific and educational institutes such as universities that accidently or randomly design organizational structures confront many problems in its advancing in the future, and because of this, designing organizational structure should have a fundamental valid concept, professional knowledge in designing methods.

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