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A structural equation model of intellectual capital based on organizational culture in higher education institutions

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ABSTRACT

The purpose of the present study was to provide a structural model of intellectual capital in higher education institutions based on organizational culture. The population of the research included all employees of Islamic Azad University, IAU,. 996 employees were selected using stratified and cluster random sampling method. The research instruments were two questionnaires which were administered in 86 IAU branches and education centers: Bontis's, 1997, Intellectual Capital Questionnaire which consisted of 52 items with three underlying constructs of human capital, customer capital, and structural capital and Cronbach Alpha of 0.95 and a researcher-made questionnaire for organizational culture which was constructed based on the Robbin's ,1996, theory with 28 items and underlying factors of individual initiative, risk tolerance, direction, integration, conflict tolerance, management contact, control, and reward system , $\alpha = 0.92$.. The results of path analysis using LISREL software indicated that dimensions of organizational culture had a direct effect on intellectual capital with the indices of 0.85 .The model also showed that the factors of individual initiative and direction in organizational culture had the highest direct effect on the intellectual capital.

Keywords: Intellectual capital, organizational culture, higher education, structural model

INTRODUCTION

Higher education system is one of the most important and complicated products of human achievements. Green explains that higher education provides the technical knowledge and skill that industry requires it in future and the fact that governments depend on this knowledge to have an effective and strategic programming[12]. In addition, universities are social systems which have been known as the center of knowledge and information as well as thinking bases for leading societies. In today's complex, competitive world, intellectual capital is considered as a competitive advantage for organizations and an indication of a part of the organization's economic function.

Intellectual capital provides the concept of knowledge management that helps managers to identify and to classify the knowledge components of an organization. Intellectual capital concepts have been an explosion of interesting studies since FORTUNE magazine published in 1991 [23]. Intellectual Capital — such as knowledge, skill, relationships — is, more than ever, the vital strategic and competitive resources. Academics believe that the benefits, which all economic participants —employees, managers, investors, governments - gain by accepting Intellectual capital as a resource and by measuring its efficiency [17]. In knowledge-based economy, companies do not produce just products or services but create added value to survive in the new economic reality. Academics believe that intellectual capital is the lever for maintaining competitive advantages and sustainable performance. Accordingly, identifying, valuing, managing Intellectual capital is becoming increasingly important for companies [2]. In Fortune, Steward [23], defines intellectual capital as “knowledge that transfers raw materials and makes them more valuable”. The concepts of intellectual capital seem to have classified as a consensus of dividing an intellectual

capital into three different groups [9]. Human capital simply comprises the competence, skills, experience, and intellectual abilities of the individual employees [4], structural capital includes processes, systems, structures, brands, intellectual property, and other intangibles that are owned by the firm but do not appear on its balance sheet [5]. The remaining type of intellectual capital is customer, social, capital resides either at the individual or the organizational level. Customer, social, capital is an intermediary form of intellectual capital consisting of knowledge in groups and networks of knowledge resources embedded within and derived from a network of relationships [10].

Culture is so important to an organization. Lynn also concluded that organizational culture is effective in successful use of intellectual capital [16]. Schein suggested that an organization's culture helps it cope with its environment [20]. The culture of an organization and its vision and purpose must be in alignment for it to change [28]. Culture influences the communication skills and decision-making processes of the organization's members and affects its credibility [14]. Organizational culture also shapes the organization's level of socialization and learning, Cooke & Rousseau, 1988., Kowalczyk & Pawlish [14], correlated the importance of culture to an organization's competitive advantage, adaptability, and level of innovation. The culture of an organization may affect organizational system operations, productivity, leadership actions, Taylor, 2003., performance [7], and organizational effectiveness [27]. Research has shown that culture has influenced employees' commitment [30]. and behaviors [1].

Robbins has mentioned the key characteristics of organizational culture as follows:

1. Individual initiative: The degree of responsibility, freedom, and independence that individuals have.
2. Risk tolerance: The degree to which employees are encouraged to be aggressive, innovative and risk-seeking
3. Direction: The degree to which the organization creates clear objectives and performance expectations
4. Integration: The degree to which units within the organization are encouraged to operate in a coordinated manner
5. Management contact: The degree to which managers provide clear communication, assistance, and support to their subordinates
6. Control: The number of rules and regulations, and the amount of direct supervision that are used to oversee and control employee behavior
7. Reward system: The degree to which reward allocations, salary increases, promotions, are based on employee performance criteria in contrast to seniority, favoritism, and so on.
8. Conflict tolerance: The degree to which employees are encouraged to air conflicts and criticisms openly [18].

In Kaplan & Norton's, 2004, model of intellectual capital, there is a special attention paid to the culture and the environment of learning. In the model, culture is the core which interrelate the components of intellectual capital. In another model called Skandia Navigator presented by Edvinsson [10], culture connects the other aspects of intellectual capital. Organizational culture combines human, structural, and customer capitals to construct intellectual capital. In another model called Technology Broker, Brooking [5], believes that culture of an organization is rooted in various factors ranging from the values staff make to the relation between the organization and the staff and customers. Here, culture is considered as an infrastructure asset which is called cooperative culture. In the model of the Canadian Imperial Bank presented by Saint-Onge [21], empirical knowledge is defined through intellectual capital as the first dynamic value in a company. In this model, organizational culture has a big role and its place as part of structural asset. In another model by Sveiby [24] called Intangible Assets Monitor, organizational culture is considered as having a major role. He believed that value comments are part of the competition and it is advisable to pay respectable attention to the work environment, customers, and the super-ordinates which is a kind of common cooperative culture. Following the studies which underlined the role of intellectual capitals in universities in Western Ontario, Bontis [3], presented the Model from the University of Western Ontario in which organizational culture is a fundamental element in forming structural asset. He believed that organizations should have the culture which is strong enough for the individuals to be able to gain new experience, failure, and learn again something new; the culture that punish the staff for their malfunctions will have the least success. Flamholtz [11], considered culture as the major factor in the development of an organization and the cornerstone of the long-run goals of a successful company. Copeland [8], also thought of organizational culture as a giant step forward in the development of the intellectual capital. The necessity to manage intellectual capital in universities is investigated by some scholars, e.g., Ramier, 2010., Moreover, as asserted by Lonnquist, et al [15], intellectual capital models can be beneficial means to management of change.

The purpose of the present study was to provide a structural model of intellectual capital based on organizational culture in universities.

MATERIALS AND METHODS

Research questions:

1. What is the structural model of the intellectual capital based on organizational culture in universities.?

2. Which variables had the highest effectiveness on intellectual capital?
3. How predictive is organizational culture on intellectual capital?
4. How much is the goodness of fit in this study?

The research methods which were used in this study are: library research to access the theoretical framework and the related literature; Survey method to collect, classify, describe, and analyze the data. The population under investigation in this study consists of official staffs who work in 420 branches and educational centers in 14 zones of

Islamic Azad University. In order to estimate the least volume of sample, $n = \frac{z^2 \sigma^2}{d^2}$ formula was used.

Regarding the minimum sample required for the staff's group which was estimated as 996 people, the same number of questionnaires of intellectual capital and organizational culture were administered to the staff in 86 branches and educational centers. In order to select the research sample, two methods of stratified and cluster random sampling were used.

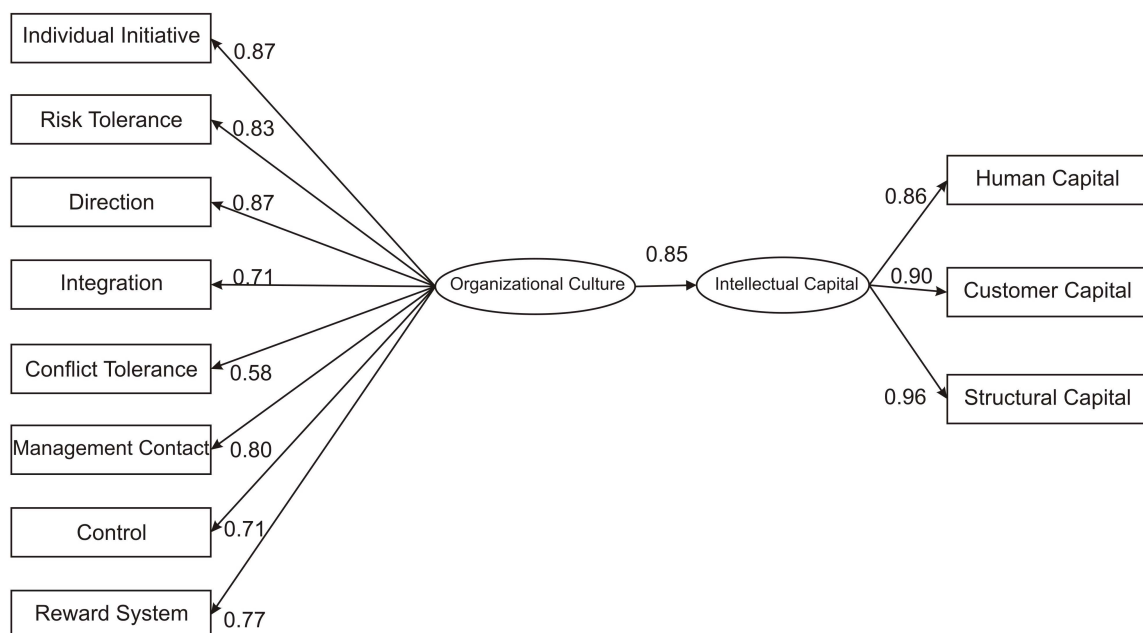
The research instruments were as follows: Bontis's [3] ,Intellectual Capital Questionnaire which consisted of 52 items with three underlying constructs of human capital, customer capital, and structural capital and Cronbach Alpha of 0.95; and a researcher-made questionnaire for organizational culture which was constructed based on the Robbin's ,1996, theory with 28 items and underlying factors of individual initiative, risk tolerance, direction, integration, conflict tolerance, management contact, control, and reward system , $\alpha = 0.92$.. The results of the study were calculated through path analysis using LISREL software.

RESULTS AND DISCUSSION

In the present research, in staffs group 569 subjects were male and 381 subjects were female. Regarding their work experience, 253 people had less than 5 years, 334 had between 6 to 10 years, and 364 had more than 11 years of work experience. Regarding the academic degree, 201 subjects had held Diploma or Associate Diploma, 569 subjects held Bachelor's degree, and 178 subjects held MA or Ph. D. degrees. Regarding the marital status of the subjects, 195 out of them were single and 736 were married.

The data collected from the administration of the instruments were analyzed. These data included the different indexes of central tendency, variability and the distribution of groups scores obtained from intellectual capital and organizational culture questionnaires and their related components. The distribution of the staffs' scores in the given variables had tendency toward normality.

Figure 1: Path analysis model for components of organizational culture with intellectual capital



As shown in Figure 1, the Lambda rate of external latent variable of organizational culture components was 0.87 for individual initiative, 0.83 for risk tolerance, 0.87 for direction,0.71 for integration,0.58 for conflict tolerance, 0.80

for management contact, 0.71 for control, and 0.77 for reward system whose accumulation form the organizational culture variable with the effectiveness rate of 0.85. It means that 85% of the variation in the dependant variable of intellectual capital management is explained by a collection of these indices. The variables of individual initiative and direction indicate the highest amount of internal consistency in the external latent variable.

The Lambda rate of internal latent variable of intellectual capital management components was 0.86 for human capital, 0.96 for structural capital, and 0.90 for customer capital whose accumulation form the intellectual capital variable. The variable of structural capital indicates the highest amount of internal consistency in the internal latent variable.

Since the model's goodness of fit index is 0.94, it can be stated that it has an acceptable fit. The calculated index indicates the direct effect of organizational culture on intellectual capital management. Moreover, the model shows that the highest direct effect is related to individual initiative and direction, the components of organizational culture, on intellectual capital management.

The following table presents the indices related to the model's fit:

Table 1: Model's fit indices

Index	Rate	Interpretation
Lewis-Tucker ,Non-normed fit index,	0.93	High fit ,more than 0.90,
Bentler-Bonett's ,Normed fit index,	0.93	High fit ,more than 0.90,
Hoelter	0.82	High fit ,more than 0.70,
Root Mean Square Error ,RMSE,	0.035	High fit ,equal to or less than 0.05,
GFI	0.94	High fit ,more than 0.90,

The five goodness of fit indices indicate presented model's fit and empirical data. Therefore, desirability adaptation is provided for the designed model and empirical data and can approve it as an appropriate model for the intellectual capital management. On this account, an appropriate model for intellectual capital management is designed based on the structural equations and the desirability adaptation is an indicative of structural equation based on organizational culture with intellectual capital. On the whole, it can be proposed that this proposed model has full fit since Lewis-Tucker's non-normed fit index ,0.93, and Bentler-Bonett's normed fit index ,0.93, were both higher than 0.90. Besides, Hoelter's index ,0.82, was higher than 0.70 and shows high fit. The root mean square error ,RMSE, ,0.035, was lower than 0.05 and indicates the new model's fit.

CONCLUSION

The results of path analysis indicated that since model's goodness of fit index is 0.94, it can be stated that it has an acceptable fit. The calculated index shows the direct effect of organizational culture on intellectual capital . The results of this study is in line with the research by Edvinsson & Malone [10],in that both emphasize the important role of organizational culture in intellectual capital model and consider culture and values as the core of intellectual capital. Also, Sanchez et al [22] ,believe that organizational culture is a new instrument to evaluate intellectual capital.

In their view toward organizational culture, Sanchez-Canizares et al[22] ,consider it as a new tool to evaluate intellectual capital. In their model, culture is the focal point between different assets. In Kaplan & Norton's [13],model of intellectual capital, there is a special attention paid to the culture and the environment of learning. In the model, culture is the core which interrelate the components of intellectual capital. In Brooking 's [6] ,model, culture is considered as an infrastructure asset which encompasses values, ceremonies, and heroes known by the organization's work force. In the intellectual capital model presented by Saint-Onge [21] ,culture is viewed as the filter to understand the environment according to which certain strategies are adopted. There would be no or little success in long-term plans if the organization's culture were not in line with these plans. Here, organizational culture acts as part of structural asset through which tacit knowledge is formed. It also determines the increase in the benefits from competition. In the model presented by Sveiby [30] ,believes that value comments are part of the competition and it is advisable to pay respectable attention to the work environment, customers, and the superordinates which is a kind of common cooperative culture. Following the studies which underlined the role of intellectual capitals in universities in Western Ontario, Bontis ,1998, presented the Model from the University of Western Ontario in which organizational culture is a fundamental element in forming structural asset. He believed that organizations should have the culture which is strong enough for the individuals to be able to gain new experience, failure, and learn again something new; the culture that punish the staff for their malfunctions will have the least success. Flamholtz [31],considered culture as the major factor in the development of an organization and

the cornerstone of the long-run goals of a successful company. Copeland [8] ,also thought of organizational culture as a giant step forward in the development of the intellectual capital. Edvinsson [10],emphasizes the important role of organizational culture in intellectual capital model and consider culture and values as the core of intellectual capital. Organizational culture is more than just the asset of an organization. Therefore, organizational culture is the surviving factor and the core of the organization and is, according to Tierney [26],an internal interactive communication network which can easily evaluate the validity of the organization.

With regard to the results of the present research on the effectiveness of organizational culture in intellectual capital it can be proposed that with improving and strengthening the factors determining organizational culture including risk tolerance, individual initiative, directing, integration, management contact, control, reward system and conflict tolerance lay foundation for boosting the intellectual capital in the branches of Islamic Azad Universities; Moreover, considering the fact that among from the organizational culture, two factors namely, individual initiative and directing exerted the most principal impact on the intellectual capital, it can be suggested that proper in-service training is delivered to the individuals to help them foster their innovation and creativity. Furthermore, the intellectual capital is developed in the branches of Islamic Azad Universities through employing the efficient management strategies and operant leadership.

Having the effective role of higher education in the economic, social, political, and cultural development, it is suggested that this study can also be carried out in other universities all around the world so as to practically take giant steps in the management of intellectual capital.

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