

## EVALUATION OF INTELLECTUAL CAPITAL AND ITS COMPONENTS IN IRANIAN UNIVERSITIES

Dr. Susan Bahrami<sup>1</sup>

### **Abstract:**

Nowadays one of the most important responsibilities of higher education is “production and diffusion of knowledge”, this responsibility is related to recruitment and retention of human resources. In spite of the fact that human resource management is a main subsystem of universities, there has been neglecting to analyze human resources as an intellectual capital in universities. The aim of this study is to evaluate intellectual capital and its components (human capital, structural capital and relational capital) in higher education institutions across Isfahan, Iran. A descriptive and analytical research method was utilized. The Statistical population included all faculty members of the state universities which a sample of 492 was selected from 1830 faculty members of 5 universities through stratified random sampling. The data collection instrument was intellectual capital questionnaire adopted from Torres (2006). Face and content validity of the questionnaire confirmed by experts and its reliability was estimated 0.95 through Cronbach's alpha coefficient. The gathered data was analyzed through descriptive and inferential statistics. The findings showed that intellectual capital and its components (human capital, structural capital and relational capital) mean scores were lower than mean criteria. Significant relationships were observed among human capital, structural capital and relational capital at the Universities. Significant differences were also observed regarding demographic variables. This paper shows to the importance of analyzing intellectual capital components in Iranian universities. It offers practical help to universities to develop means to identify, measure, manage and value their intangible assets.

**Keywords:** intellectual capital, human capital, structural capital, relational capital, university.

---

<sup>1</sup>- PhD, Assistant Professor, Faculty of Humanity sciences, University of Qom, Qom, Iran.

## Introduction

There is common agreement on the idea that, under the new pattern of the knowledge-based economy, wealth and economic growth is “driven primarily from intangible (intellectual) assets” (Lev2000). Although knowledge management and intellectual capital investigations were conducted mostly in private companies during the last decades, there is an increasing interest to identify and manage this capital in public organizations, such as universities and research centers. This latest concern rises from the fact that universities’ key goals are the production and diffusion of knowledge and their main investments are in research and human resources (Can˜ibano and Sa´nchez2004). Traditionally, Iranian universities have been functioning, separate from the society and have been working under strict regulations that do not allow them to be flexible and innovative. Today, higher education is affected by a number of new challenges; which have changed our way of training and research (Goldsmith et al.2005). If a knowledge-based society is characterized by the creation, transmission and distribution of knowledge and intellectual capital, universities are to play a unique role in all these processes (European Commission 2003b).

Once Drucker (1965) stressed that if the main valuable asset of an enterprise was its production tools in the 20th century, knowledge workers and their productivity is considered as the main asset in the 21<sup>st</sup> century. Since knowledge has become the main key element of modern production, how to manage properly the intellectual capital of an enterprise, particularly the human capital, is one of the critical subjects in organizational management (Steward 2003).

### Definition of intellectual capital

Intellectual capital, a term first introduced by economist John Kenneth Galbraith in 1969, refers to the differentiation between an organization's market value and book value. Several researchers have come to consider intellectual capital as an organization's primary means of creating competitive advantage. The abstract and dynamic nature of intellectual capital makes it complex for scholars to define (Zhou and Fink 2003).

Guthrie (2001) comments that many consider intellectual capital and intellectual assets or intangible assets as synonyms (P: 27–41). Prior studies point out that intellectual capital is the creation of dynamic production processes, and is intimately associated to knowledge management

or organizational learning(Stewart2003; Lynn 1999).Several researchers argue that accumulating intellectual capital is valuableto create competitive advantage (Kaplan and Norton 1992; Edvinsson1997). In the light of above-mentionedliterature, in this study intellectual capital is defined the total capabilities, knowledge, culture, strategy, process, intellectualproperty, and relational networks of an organizationso that it can achieve competitive advantages and its goals.

### **Components of intellectual capital**

Science there was not a generally accepted definition of intellectual capital, there was not also consensus about its components during the early years of studying this subject.<sup>11</sup> Though, byrisingdiscussions on intellectual capital, a majority of the studies follow the framework proposed by Roos and Roos(1998), Bontis(1998), Johnson (1999)andBozbura(2004), in which human capital, structural capital, and relational capital are considered as the three essential dimensions of intellectual capital. This model is also adopted in this study. Human capital includes faculty members and managers' competence, experience, knowledge, skills, attitude, commitment, and wisdom. Human capital is produced and deployed, when more time and talent of employees are devoted to activities that result in innovation. Structural capital is the knowledge retained inside the organization. It belongs to the organization as a whole and can be reproduced and shared. Structural capital includes workflow, operationprocesses, specific methods, information technology systems, and cooperative culture, etc(Chen2004).The relational capital refers to the relationship between enterprises, customers, suppliers and partners(Johnson1999).

Hsu and Fang (2009) showed that human capital and relational capital actually improve new product development performance through organizational learning capability. Although structural capital positively affects organizational learning capability, managers should pay attention to possibly negative effects of structural capital on new product development performance.

In this research human capital is defined as a set of explicit and tacit knowledge of the universities' personnel acquired through formal and informal education and actualization processes embodied in their activities.Structural capital is the explicit knowledge related to the internal process of dissemination, communication and management of scientific and technical knowledge in the organization. Relational capital is a wide set of economical, political and institutional relationships developed and maintained by universities.This study purposely focuses

on examining the intellectual capital (human capital, structural capital and relational capital) at the five state universities.

### Methodology

The present study employs a questionnaire survey approach to collect data for testing includes 32 items concerning research question. The questionnaire adopted from Torres model (2006) intellectual capital. All items require ten-point Likert style responses ranging from “strongly disagree” to “strongly agree”. The statistical population of the study is 1830 faculty members in 5 universities including Isfahan University, Isfahan University of Technology, Kashan University, and Isfahan University of medical Sciences and Kashan University of medical Sciences. A stratified random sampling method was utilized to select 492 faculty members about 500 questionnaires were distributed and 490 questionnaires were returned, 10 of which were incomplete. Therefore, 480 valid and complete questionnaires were considered for the quantitative analysis. The sample consists of 396 men (82.5%) and 84 women (17.5%). 16.7% are lecturer, 60.4% are assistant professor, 4.4% are associate professor and 4.4% are full professor. Data were composed by one questionnaire.

To verify validity of the questionnaire face and content validity was confirmed through authority opinions and reliability coefficient of the questionnaire was estimated through Cronbach's alpha coefficient ( $r_1 = 0.95$ ). To analyze the data t-test, MANOVA and LSD test were used.

### Result and discussion

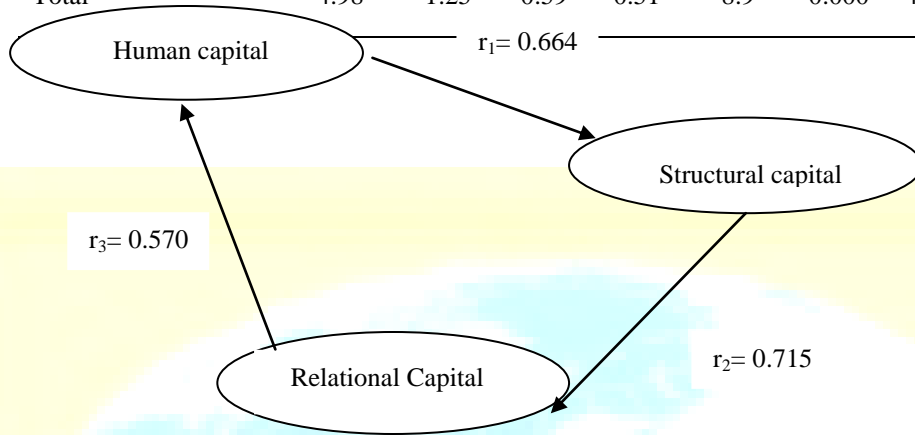
Table 1 displays the means, standard deviation, and confidence intervals of intellectual capital. Confidence intervals show that means score of human capital was between 4.89 and 5.21 means score of structural capital was between 4.88 and 5.21 and relational capital was between 4.69 and 5.04 with probability of 99 percent.

**Table 1.**

Intellectual Capital mean, standard deviation, and Confidence intervals ( $\bar{X} = 5.5$ ,  $df = 479$ )

| Indicators           | $\bar{X}$ | S | SK | $\bar{X} d$ | tob | P | Confidence intervals<br>( $\alpha = \%99$ ) |
|----------------------|-----------|---|----|-------------|-----|---|---|
| Intellectual Capital |           |   |    |             |     |   |   |

|                    |      |      |      |       |       |       |            |
|--------------------|------|------|------|-------|-------|-------|------------|
| Human Capital      | 5.05 | 1.35 | 0.27 | -0.45 | -7.28 | 0.000 | 4.89-5.21  |
| Structural Capital | 5.04 | 1.39 | 0.59 | -0.46 | -7.1  | 0.000 | 4.88-5.21  |
| Relational Capital | 4.86 | 1.49 | 0.24 | -0.62 | -9.2  | 0.000 | 4.69- 5.04 |
| Total              | 4.98 | 1.25 | 0.59 | -0.51 | -8.9  | 0.000 | 4.84-5.13  |



**Figure1.** Correlation coefficient among intellectual capital components.

Figure1 indicates that the correlation coefficient between human capital, structural capital and relational capital are positive and significant ( $p \leq 0.01$ ).

**Table2.**

Comparison of mean, standard deviation of intellectual capital components

| Indicators            | intellectual capital | F     | Sig   | partial Eta Squared | Observed Power |
|-----------------------|----------------------|-------|-------|---------------------|----------------|
| Demographic variables | Human                | 2.165 | 0.072 | 0.023               | 0.638          |
|                       | Structural           | 5.096 | 0.001 | 0.053               | 0.965          |
|                       | Relational           | 1.941 | 0.103 | 0.021               | 0.586          |
| University Type       | Human                | 0.289 | 0.833 | 0.002               | 0.106          |
|                       | Structural           | 1.060 | 0.366 | 0.009               | 0.287          |
|                       | Relational           | 1.323 | 0.267 | 0.011               | 0.325          |
| University Rank       | Human                | 1.805 | 0.127 | 0.019               | 0.549          |
|                       | Structural           | 1.002 | 0.406 | 0.11                | 0.317          |
|                       | Relational           | 1.369 | 0.244 | 0.15                | 0.426          |
| Age                   | Human                | 1.805 | 0.127 | 0.019               | 0.549          |
|                       | Structural           | 1.002 | 0.406 | 0.11                | 0.317          |
|                       | Relational           | 1.369 | 0.244 | 0.15                | 0.426          |

|                    |            |       |       |       |       |
|--------------------|------------|-------|-------|-------|-------|
| Service Background | Human      | 5.537 | 0.001 | 0.043 | 0.940 |
|                    | Structural | 3.798 | 0.011 | 0.030 | 0.814 |
|                    | Relational | 2.984 | 0.33  | 0.024 | 0.698 |
| sex                | Human      | 1.004 | 0.317 | 0.003 | 0.170 |
|                    | Structural | 4.004 | 0.056 | 0.11  | 0.514 |
|                    | Relational | 1.283 | 0.258 | 0.003 | 0.204 |

According to finding of table 2, multivariate analysis (MANOVA) showed that observed F at confidence level of  $p \leq 0.05$  for intellectual capital components according to demographic characteristics is significant. Etas square for sex, age, university rank are not significant. But Eta square for university type and service background is significant (Table 2).

**Table3.**

Paired comparison of Mean Differences and standard deviation of intellectual capital components

| Intellectual Capital | Demographic Variables  | Mean Differences | Sig   |
|----------------------|--|------------------|-------|
| Structural Capital   | University Type<br>Isfahan University and Isfahan University of medical Sciences | 0.9642           | 0.000 |
|                      | Isfahan University and Isfahan University of Technology                          | 0.4558           | 0.007 |
|                      | Isfahan University and Kashan university   | 0.9510           | 0.000 |
| Human Capital        | Service Background<br>Higher than 21 years and 1 - 10 years                      | 0.3382           | 0.034 |
| Relational Capital   | Service Background<br>Higher than 21 years and 1 - 10 years                      | 0.5998           | 0.001 |

According to finding of table 3, LSD test results identified that structural capital in Isfahan University was more than other universities. LSD test results identified that human capital and relational capital according to faculty member's members with service background of higher than 21 years were more than those with 1 - 10 years.



We are moving towards a knowledge-based economy and intangible assets and values are seen as necessary elements in order to value innovation in organizations and to economic wealth (Can˜ibano and Sa´nchez, 2004), since the last decade of the 20<sup>th</sup> century main economic theories have documented, to a larger or smaller degree, the significance of intangible elements that explain part of the economic growth (Nonaka 1994; European Commission 2003b).

We have identified the intangible assets that make up the intellectual capital on Isfahan state universities lower than mean average. Second, the relative importance of each Intellectual Capital components has been proven, and there is a significant positive correlation among the 3 dimensions of intellectual capital (human, structural and relational). Torres (2006) found that human capital had a positive effect on structural capital, structural capital had a positive effect on relational capital; relational capital had a positive effect on human capital.

Finally, significant differences were observed between intellectual capital components regarding demographic variables. Huang and Hsueh (2007) found out that structural capital and relational capital have better performance, and human capital presents the poorest performance, showing that Taiwan's engineering consulting firms give little prominence to human resource management. Hsu and Fang (2009) showed that human capital and relational capital actually improve new product development performance through organizational learning capability.

As for Iranian universities in delivering knowledge services, the most valuable asset is the knowledge and experience of the staff. So, the first step is to promote the human capital, structural capital, relational capital and make the faculty members learn necessary knowledge within the shortest time, and shorten the time for troubleshooting, encourage faculty members to provide knowledge and share experience with others, thus creating a knowledge-sharing enterprise culture.

### References:

- [1] Bontis, N., 1998, Intellectual capital: an exploratory study that develops measures and models, *Manage Decis*, 36 (2), pp 63–76.
- [2] Bozbura, F.T., 2004, Measurement and application of intellectual capital in Turkey. *Learn Organ*, 11 (4/5), pp 357–367.
- [3] Can˜ibano, L. and Sa´nchez, P., 2004, Measurement, management and reporting on intangibles: state of the art. *Accounting and Business Review*, pp 56-68.

- [4] Chen, J.Zhu., Z. and Xie, H.Y., 2004, Measuring intellectual capital: a new model and empirical Study. *Journal of Intellectual Capital*, 5 (1),pp195-212.
- [5] Edvinsson, L., Malone, M.S (1997). *Intellectual Capital: Realizing Your Company's True Value by Finding its Hidden Roots*, Happer Collins, USA.
- [6] Edvinsson, L., 2000,Some perspectives on intangibles and intellectual capital. *Journal of IntellectualCapital*, 1(1),pp12–16.
- [7] European Commission (2003b). *Study on the Measurement of Intangibles Assets and Associated Reporting Practices*, (abridged version), Enterprise Directorate-General, Brussels.
- [8] Goldsmith, P. D., Ramos G. and Steiger, C (2005). *Intellectual Property Piracy in a North-South Context: Empirical Evidence*. *Agricultural Economics*. In Print. October.
- [9] Guthrie, J., 2001,The management, measurement and reporting of intellectual capital.*Journal of Intellectual Capital*, 2 (1),pp 27–41.
- [10] Huang, C. F., Hsueh, S.L., 2007,A study on the relationship between intellectual capital and business performance in the engineering consulting industry: A path analysis. *Journal of Civil*, 13(4),pp 265–271.
- [11] Hsu, Y. H., Fang, W., 2009,Intellectual capital and new product development performance: The mediating role of organizational learning capability. *Technological Forecasting & Social Change*, 76, pp664–677.
- [12] Johnson, W.H.A., 1999,An integrative taxonomy of intellectual capital: measuring the stock and flow of intellectual capital components in the firm.*International Journal of Technology Management*, 18 (5/6/7/8), pp 562–575.
- [13] Kaplan, R.S., Norton, D.P.,1992,The balanced scorecard— measures that drive performance. *Harvard Bus Rev*, pp 71–79.
- [14] Lev, B., 2000,Intangibles: management, measurement and reporting.Available at [www: Baruch-lev.com](http://www.Baruch-lev.com).
- [15] Lynn, B.E., 1999, Culture and intellectual capital management: a key factor in successful ICM implementation. *International Journal of Technology Management*, 18 (5/6/7/8),pp 591–603.
- [16] Nonaka, I., 1994,A dynamic theory of organizational knowledge creation. *Organizational Science*. 5(1), pp14–37.



- [17] Roos, J., Roos, R., Edvinsson, L and Dragonetti, N (1998). Intellectual Capital: Navigating in the New Business Landscape. New York University Press, New York
- [18] Steward, T. A (2003). Intellectual capital: the new wealth of organizations. Bantam Dell Publishing Group, New York.
- [19] Torres, M.R. M., 2006, A procedure to design a structural and measurement model of Intellectual Capital: An exploratory study. Information & Management, 43, pp 617–626.
- [20] Zhou, A.Z., Fink, D., 2003, The intellectual capital web. Journal of Intellectual Capital, 4(1), pp34–48

