

Intellectual Capital Indicators in Universities of Iran. Case Study of Islamic Azad University of Khuzestan

Ahmad Kaab OMEIR¹
Zahra MORADIKIA²
Zahra DARVISHZADEH³

^{1,2,3}Department of Accounting Science and Research branch, Islamic Azad University, Ahvaz, Iran,
¹E-mail: kaab.occ@gmail.com, ²E-mail: moradikia1392@yahoo.com,
³E-mail: sakinehdarvishzadeh@yahoo.com

Abstract *The aim of this study is ranking the Islamic Azad Universities of Khuzestan province based on operational indicators of intellectual capital. 5 universities were selected from all Islamic Azad Universities of Khuzestan province in order to conduct this study and the required data were collected by interviewing and reviewing the existing documents and evidence. Data were analyzed using SPSS software and Friedman and Kruskal Wallis statistical tests. In order to conduct this study, first, intellectual capital indicators in selected centers were investigated that the results show that intellectual capital indicators in the mentioned centers are not equally important, and indicators of education, human capital, structural capital, communication capital, research, knowledge transfer to the public and commercialization are ranked first to seventh. Then, university ranking test was conducted based on operational indicators of intellectual capital that Islamic Azad University of Ahvaz, Dezful, Shushtar, Abadan and Masjed Soleiman were ranked first to fifth, respectively.*

Key words Intellectual capital, operational indicators of intellectual capital, university ranking

DOI: 10.6007/IJARAFMS/v7-i3/3281

URL: <http://dx.doi.org/10.6007/IJARAFMS/v7-i3/3281>

1. Introduction

The new field of intellectual capital is a new research area for the researchers and organizational practitioners who focus on creating new measurement mechanisms to report intangible variables such as human capital and customer satisfaction and innovation. On the other hand, this intangible resource has been introduced as one of the most value adding resources of companies and key capital in the growth of entrepreneurship, so that, it is considered the most valuable tool for developing the key assets of the organization.

The organizations use intellectual capital which is a kind of transformed knowledge in line with organizational value creation and improving business process and use this intangible asset better. In the knowledge-based economy, products and organizations are revived based on knowledge and are destroyed in case of no attention. The experts called the 80s the decade of the quality movement, and the 90s the decade of re-engineering, and the current decade the decade of knowledge management (Bonits, 1998). Considering that understanding and exploiting critical intangible resources such as intellectual capital helps maintain and gain competitive advantage in organizations, this study tries to investigate the components of intellectual capital in the success of these universities by defining intellectual capital and investigating operational indicators in the Islamic Azad Universities of Khuzestan and ranking these universities based on intellectual capital indicators and to deals with providing strategies which lead to promoting intellectual capital and subsequently, improving and developing universities.

2. Theoretical foundations

Nowadays, knowledge is a fundamental and determinant source to increase the performance of organizations unlike reducing traditional resources efficiency (money, land, and machinery). In a knowledge

organization, the profit of the result of producing new ideas and innovations is the result of interaction between structural and human capitals, and value, size, and share of this hidden value have been changed due to the interaction between the physical and intangible assets of knowledge (Salavati and Maddah, 2008). There is no consensus on what the intellectual capital is, and several definitions have been proposed that some of these definitions will be mentioned. Edvinsson and Malone (1997) have defined the intellectual capital as "Information and knowledge used to work in order to create value". Bontis and Holland (2002) define the intellectual capital as the intellectual capital shows a reserve of knowledge that exists at a certain point of time in an organization. Ros and Baron (2005) state that intellectual capital is an asset that measures the organization's ability to create wealth. This asset does not have an objective and physical nature and is an intangible asset which has been achieved through the use of assets related to human resources, organizational performance, and relationships outside the organization. All of these features create value within the organization and this achieved value cannot be bought and sold because it is a purely domestic phenomenon.

2.1. Components of intellectual capital

In the field of classification of intellectual capital components, several classifications have been made so far, however, most of the scholars and experts of intellectual capital agree on three elements of it that these elements include:

a) Human capital

Human capital constitutes the basis of intellectual capital and is the main element to implement functions related to intellectual capital which is able to understand topics and create benefits from the experiences which gains. Human capital is important for the organizations as a source of strategic innovation and reconstruction (Bontis, 1999). In fact, the human capital expresses the a reserve of knowledge of the organization which is shown by the staff, and includes individual capabilities, knowledge, skills and experiences of the staff and managers of the organization which is associated with the tasks of them and refers to increasing capacity and reserve of knowledge, skills and experiences through individuals' learning. This capital has been defined in the universities as the knowledge that human resources (instructors, researchers, Ph.D. students and administrative staff) provide to the organization, and will be lost by leaving these individuals from the organization.

b) Structural capital

Structural capital is considered supportive sub-structure of human capital and includes all non-human reserves of knowledge in the organization which includes databases, organizational charts, process instructions, strategies and whatever worth more than material value for the organization. Therefore, they create value for the organizations and increase the material value of organizations. This capital creates an environment that knowledge is created through it and is prepared to enter the market (Soibi, 1997). Structural capital in the universities includes ruling principles such as organizational rules, procedures, systems, culture, databases and individual ownership.

c) Communication capital or customer capital

Communication capital refers to the total assets that organize and manage customer relationships with the environment and includes cases such as trademarks, market share, customer information, customer relationships, customer access points, and business contracts. In the universities, this capital has been defined as all resources that link the organization to external forces such as customers, suppliers, research and development partners, and the government.

3. Literature review

Gomes et al. (2017) The study investigated the understanding of the directors and managers of the Research Units (Unidades de Pesquisa – UP) linked to the Brazilian Ministry of Science, Technology and Innovation (Ministério da Ciência, Tecnologia & Inovação – MCTI) on the creation of value and innovations. A descriptive approach was adopted, with functionalist discussion and quantitative research to measure the relationship between the data and test hypotheses about the sample – the interdependence between value creation drivers and the differentiated perception about value creation via intangible drivers. The

findings allow to affirm that there are distinct clusters of UP, with greater importance, in general, attributed to Relational Capital.

Secundo *et al.* (2017) investigated the Intellectual Capital framework to measure universities' third mission activities of universities are related to the generation, use, application and exploitation of knowledge with external stakeholders and society in general. The paper proposes a new conceptual framework based on Intellectual Capital approaches to measure third mission activities of universities. The framework establishes a generic approach for systematically analyzing third stream activities in universities. Moving from the third mission goals, it focuses on three interrelated areas: research, i.e. technology transfer and innovation, teaching, i.e. lifelong learning and continuing education, as well as, social engagement in line with regional and national development. A first exploration of the framework in four European universities approaching third mission performance is provided to discuss implementation opportunities. Finally, theoretical and empirical implications are discussed indicating avenues for moving ahead academic research.

Chau *et al.* (2016) in a study entitled Aligning university–industry interactions: The role of boundary spanning in intellectual capital transfer: The results of this study showed that; Studies in the UK have focused on the relative performance of technology transfer organizations (TTOs)/knowledge transfer organizations (KTOs) or their use by academics and external organizations. Compared to their US and international counterparts, TTOs/KTOs at UK universities exhibit low-levels of absolute efficiency. Therefore questions remain relating to how to raise the efficiency and productivity of these units, how to attract and train staff with suitable qualifications/capabilities and how to change adverse attitudes towards knowledge exchange by some academics. Currently, there is a lack of a holistic view of these functions and the way they complement each other or coordinate their activities. This study addresses this gap in theory and practice and advances how universities should provide consistency in both the internal and the external interfaces, by the offer of a framework and key stakeholder insights.

Rossi *et al.* (2016) investigated Strategic Asset Strategies in Italian Companies. This article describes a framework for the strategic management of intellectual capital assets (ICAs). The article shows how the implementation of the framework within an Italian firm allows identifying several critical ICAs. Furthermore, the article describes how the validation of the recommendations encourages the implementation of actions that aim to create value for the firm. Rostami *et al.* (2016) dealt with the pathology of intellectual capital in the employees of Kermanshah University of Medical Sciences. The results of this study showed that the dimensions of intellectual capital in the University of Medical Sciences are in good condition, and communication capital which represents the interactive manner of outside the organization needs more attention. Also, there is a significant difference between the mean of staffs' comments and except for work experience. There is a significant relationship between the dimensions of intellectual capital and the factor of human capital has the most important impact in the conceptual model.

Rahimi *et al.* (2015) in a study entitled intellectual capital and knowledge management processes in the quantum organization: case study of Kashan University dealt with investigating Faculty Members of Kashan University in the academic year of 2015-16 using a researcher-made questionnaire of intellectual capital with 29 items in three components of (structural capital, human capital and customer capital), standard questionnaire of knowledge conversion process with 24 items in four components of (socialization, internalization, externalization, and combination), standard questionnaire of quantum organization with 27 items in six components of (Trust, Values, Thinking Together, Dialogue, Learning and Spirituality) based on a 5-point Likert scale. The results showed that the mean of each component of intellectual capital, knowledge conversion process, and quantum organization in the university is higher than the hypothetical mean, and the more the components of intellectual capital and knowledge conversion process in the university increase, the amount of realization of the component of quantum organization will be increased as well.

Shahsavari *et al.* (2014) investigated the conceptual model of intellectual capital in higher education is Sharif University. The research method is a descriptive survey that its population includes 103 faculty members. The results show that the status of human capital higher than average, but the status of innovation capital, organizational capital and communication capital is lower than the average. So that, totally based on the results, the overall status of intellectual capital in the Sharif University has been obtained lower than the average. Dolat Abadi *et al.* (2013) dealt with exposing intellectual capital and

measuring it using game theory. In this study, there was a discussion about exposing intellectual capital after presenting some definition of intellectual capital and expressing its value and importance, and it was emphasized that some comprehensive definitions of intellectual capital and its nature and exposing intellectual capital must be found in order to better evaluation of intellectual capital.

4. Methodology of research

4.1. Research hypothesis

The amount of benefit from intellectual capital and its indicators in the various Islamic Azad Universities of Khuzestan is equal.

4.2. Statistical population and sample

The statistical population of this study includes all Islamic Azad universities in Khuzestan province that 5 top and older universities have been selected as sample.

4.3. Research variables

In this study, the components of intellectual capital that include 7 components (human capital, structural capital, communication capital, research, education, commercialization, knowledge transfer to the public) have been considered as the independent variable and the university as the dependent variable.

4.4. Research model

The research model is the basis for conducting studies and research so that it specifies the desired variables and relationships between them. In other words, it can be said that the conceptual model or the mental map and analytical tool is ideally a strategy for starting and conducting research, so that it is expected that the variables, relationships and interactions between them to be investigated and tested during the implementation of the research, and some modifications to be made if necessary, and some factors to be increased or decreased. In relation to the elements of intellectual capital, it was stated that in most classifications, intellectual capital has been classified to three parts of human capital, communication capital (customer capital), and structural capital; but in this study we use the framework provided by Leitner and has been used by many universities including universities in Taiwan, Austria and England as a pattern of action that in this framework, intellectual capital has been divided into seven classes of (human capital, structural capital, communication capital, research, education, commercialization, knowledge transfer to the public) and 39 indicators are used to measure these elements that we will define these seven classes in this section.

1. Human capital: The knowledge that the university department (instructors, researchers, Ph.D. students and service and administrative staff) provides to the organization that will be lost by leaving these individuals from the organization.

2. Structural capital: Explicit and obvious knowledge of internal processes, promotion, and establishing technical and scientific communication at the university.

3. Communication capital: A wide set of developed and preserved institutional, political, economic relationships between the university and non-scientific partners such as institutions, non-profit organizations, local government, and community. Also, it includes others' perception of the university, imagination, judgment, trust and so on.

4. Research: It includes information about research section and access to research budgets and generally the details of research projects.

5. Education: This section deals with providing information about the number of students and details about the students.

6. Commercialization: It shows the created side activities as well as the income from employment in these activities.

7. Knowledge transfer to the public: Nowadays, many individuals use information published by the university and this section of intellectual capital is applicable to all those position and status depends on access to information.

Table 1. Assessment indicators of intellectual capital in the universities and higher education institutions

Components of intellectual capital	Assessment indicators
1. Human capital	1-1 The number of academic staff
	1-2 The number of research staff
	1-3 The number of full-time professors
	1-4 The number of assistant professors
	1-5 The amount of relocation of official scientific staff
	1-6 The amount of relocation of temporary scientific staff
	1-7 The amount of increase in the official scientific staff
	1-8 The amount of increase in the temporary scientific staff
	1-9 the average time of employment of scientific staff
	1-10 raining costs
2. Structural capital	2-1 Investment in electronic and library means of communication
3.Communication capital	3-1 Abroad research exchange
	3-2 The number of active foreign staff in the University
	3-3 The number of attendance at conferences
	3-4 The number of being host at conferences
	3-5 The number of staff who have been employed with non-institutional budget
	3-6 The amount of activity of specialized committees
	3-7 The growth rate of research programs
	3-8 New common collaborations
4.Research	4-1 The number of publications printed (referred)
	4-2 The number of printing publications
	4-3 The amount of non-organizational budget (research contracts)
	4-4 The total number of publications
	4-5 Publications printed in cooperation with industry
	4-6 Research equipment, capabilities
	4-7 Ph.D. and postdoctoral students
	4-8 Non-organizational financial credits (research contracts and so on)
5.Education	5-1 Graduate rate
	5-2 Average length of study of the students
	5-3 Rate of rejected students
	5-4 The number of finished Ph.D. and Master's Theses
6.Commercialization	6-1 The number of additive companies of the University
	6-2 The number of staffs absorbed by additive companies
	6-3 Income from issuing permit and the number of research permissions
7.Knowledge transfer to the public	7-1 Through the website
	7-2 Through non-specialized lectures

5. Research findings

This section deals with analyzing data related to operational indicators of intellectual capital. In general, the analysis of this study has been conducted in two stages. The first stage deals with ranking intellectual capital indicators in selected universities using Friedman and Kruskal Wallis tests. The second stage of the study is related to the ranking universities based on operational indicators of intellectual capital.

5.1. First stage: Ranking intellectual capital indicators in the studied universities

This stage deals with investigating seven indicators of intellectual capital in the selected universities using Friedman test, and these indicators will be ranked for total universities.

Table 2. Friedman test hypotheses

Question	Do the variables of intellectual capital equally important for the universities?	
Research hypotheses	Null hypothesis	All variables are equally important
	One hypothesis	All variables are not equally important
Statistical hypotheses	Null hypothesis	The means do not differ H0: $\mu_1 = \mu_2 = \mu_3 = \mu_4 = \mu_5$
	One hypothesis	The means differ H1: $\mu_1 \neq \mu_2 \neq \mu_3 \neq \mu_4 \neq \mu_5$

Table 3. Friedman test result

Variables of intellectual capital	Mean rank
Human capital	6/00
Structural capital	4/50
Communication capital	3/67
Research	3/00
Education	7/00
Commercialization	1/17
Knowledge transfer to the public	2/67

Sample size	chi-square statistic	degree of freedom	significance level
5	28/114	6	0/000

5.1.1. First stage analysis

In Table 3, the mean of indices and in the second table, sample size, chi-square statistic, degree of freedom, and significance level of the test statistic were calculated. Given that the calculated level is less than 0.05, which show that the null hypothesis is rejected; That is, the difference between the tests is concluded, and as you see in Table 3, the rankings of the seven indicators for the total of selected universities are as follows: 1. Education 2. Human capital 3. Structural capital 4. Communication capital 5. Research 6. Knowledge transfer to the public 7. Commercialization.

Table 4. Ranking intellectual capital indicators in selected universities

Assessment indicators	Ranking
Education	First rank
Human capital	Second rank
Structural capital	Third rank
Communication capital	Fourth rank
Research	Fifth rank
Knowledge transfer to the public	Sixth rank
Commercialization	Seventh rank

5.2. Second stage: University ranking test

This stage deals with ranking selected universities based on the level of intellectual capital. For this stage, the test hypotheses are as follows.

Table 5. Kruskal Wallis test hypotheses for the level of intellectual capital in selected universities

Question	How is the level of intellectual capital in selected universities?	
Research hypotheses	Null hypothesis	The level of intellectual capital in selected universities is equal
	One hypothesis	The level of intellectual capital in selected universities is not equal
Statistical hypotheses	Null hypothesis	H0: $\mu_1 = \mu_2 = \mu_3 = \mu_4 = \mu_5$
	One hypothesis	At least one of the pairs of the above equations do not exist

Table 6. Kruskal Wallis test result

Academic units	Mean rank	Rank
Ahwaz	90.88	First
Abadan	67.23	Fourth
Shushtar	87.11	Third
Masjed Soleiman	66.44	Fifth
Dezful	90.84	Second

chi-square statistic	Degree of freedom	Significance level
9/598	4	0/048

5.2.1. Second stage analysis

The name of selected academic units and the mean rank of each selected university along with the rank of each university based on the operational indicators of intellectual capital can be observed in table 6, and the next table contains the main test result. As it is observed in this table, the amount of the chi-square statistic is 9.598 with a degree of freedom 4 and significance level of 0.048 which show that the null hypothesis is rejected; that is, the hypothesis of the mean equality of the level of intellectual capital in selected universities is rejected. Thus, according to Kruskal Wallis test, Islamic Azad University of Ahwaz is ranked first, The Islamic Azad University of Dezful is ranked second, The Islamic Azad University of Shushtar is ranked third, The Islamic Azad University of Abadan is ranked fourth, and The Islamic Azad University of Masjed Soleiman is ranked fifth in terms of the level of intellectual capital.

6. Conclusions and suggestions

6.1. Discussions and conclusions

The organizations which have a high level of intellectual capital such as the universities and higher education institutions must have high value added services, organizational learning, protection and provision of information at the level of organizational knowledge. The analysts and researchers must be also looking to formulate this kind of capital. Intellectual capital, collective mental ability, or key knowledge is as a set. Accordingly, in order to quick access to the scientific advances of the country and achieve to the power area (especially scientifically), according to the twenty years perspective of the Islamic Republic of Iran, synergy in academic research and activities and reducing the scientific gap with developed countries will be possible as a result of paying attention to the operational indicators of intellectual capital. All resources can be continuously and effectively used to achieve the desired goals and duplication and dealing with parallel activities can be prevented if such an approach is created. Also, the mental knowledge created by the researchers will become objective knowledge, and publishing it will be possible in addition to preventing forget the experiences and information and the necessary conditions for the survival and success of the universities in the competitive arena will be provided.

As explained in detail in the previous sections, this study has dealt with ranking operational indicators of intellectual capital among Islamic Azad Universities of Khuzestan province from 2008 to 2012. Five universities were selected as a sample and the required data were collected by interviewing and reviewing the existing documents and evidence in these universities. Then, the hypotheses of this study were investigated using descriptive and analytical statistics such as Friedman and Kruskal Wallis tests.

In the ranking seven indicators of intellectual capital for the all study universities, the null hypothesis was rejected; that is the hypothesis of the mean equality of the level of intellectual capital was rejected that the results of this study are consistent with the results of the study of Aji Bisheh and Mansouri, and are consistent with the study of Niazi and Abu Nouri in terms of the difference in mean of indicators in different units, but communication capital was ranked first in the study of Abu Nouri but it is ranked fourth in this study that may be due to the differences in the environmental and geographical conditions of the study units.

6.2. Suggestions

According to the results of this study, suggestions can be made on seven axes in order to strengthen and develop the intellectual capital indicators in the Islamic Azad universities of Khuzestan province.

- Identifying the individual capabilities of the personnel and their knowledge and skills;
- Designing the framework of staffs' competencies and development planning based on their competencies;
- Effective use of human resources in order to empower them;
- Use of advanced and modern structures in different parts of the universities;
- Favorable cooperation between the university and other governmental and non-governmental organizations;
- Use of the experiences of foreign competitors who are more successful in the research;
- Providing strategies, consultation, and suggestions to help students to succeed in studying;
- Holding training courses;
- Establishing growth centers and science and technology parks;
- Establishing workspaces and facilities suitable for achieving high value added;
- Holding public lectures in the city on various occasions.

References

1. Nejati, Mansouri, A.B. (2011). Investigating and Measuring the Status of Intellectual Capital in Universities and Higher Education Institutions (Case Study: Educational Complexes of Yazd Universities). *Journal of Iranian Higher Education*, issue 14, pp. 49-70.
2. Niyazi and Nouri, A. (2011). Ranking of Intellectual Capital Indices (A Case Study: Libraries and Information Centers of Mazandaran Universities, Mazandaran University of Medical Sciences, Golestan University of Medical Sciences and Gorgan University of Medical Sciences). *Library and Information*, Issue 3, pp. 163-192.
3. Parshokov, N.I. (2013). Intellectual Capital Investments: Evidence from Panel Var Analysis. Electronic copy available at: <http://ssrn.com/abstract=2204952>.
4. Rezende, F., Assunção, A., Bruno, C., Gomes, A. (2017). The intellectual capital and the creation of value in research units linked to the Brazilian Ministry of Science Technology and Innovation. Original Research Article RAI *Revista de Administração e Inovação*, Vol. 14, Issue 3, pp. 199-215.
5. Rossi, C., Cricelli, L., Grimaldi, M., Greco, M. (2016). The strategic assessment of intellectual capital assets: An application within Terradue Srl. *Journal of Business Research*, Volume 69, Issue 5, May 2016, pp. 1598-1603.
6. Rostami, R., Vaismoradi, A., Dastanbo, F. (2016). Intellectual capital in the employees of Kermanshah University of Medical Sciences. *Journal of Clinical Research in Paramedical Sciences*. Volume 5, issue 3, pp. 277-285.
7. Secundo, G., Perez, S.E., Martinaitis, Z., Leitner, K. H. (2017). An Intellectual Capital framework to measure universities' third mission activities. *Technological Forecasting and Social Change*, In Press, Corrected Proof.
8. Shahsavari, A., Yamani, D.S.M., Aboulghasemi, M. (2014). Model of intellectual capital in higher education in Sharif University. *Journal of Iranian Higher Education* Issue 23, May 2014.
9. Stewart, T. (1997). Intellectual capital, the wealth of organizations. *Covenant Managers Magazine*, pp. 46-47.
10. Sum Chau, V., Gilman, M., Serbanica, C. (2016). Aligning university industry interactions: The role of boundary spanning in intellectual capital transfer. *Technological Forecasting and Social Change*, In Press, Corrected Proof, Available online 1 April 2016.