

Identifying and ranking indicators of intellectual capital in higher educational institutions from perspective of faculty members: a case study University of S and B

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Abstract: From a strategic perspective, the intellectual capital is one of the key drivers of growth and organizations development. These intangible assets to be used for Knowledge creation and performance promotion of higher education centers and success at these centers depends on their intellectual capital situation. Therefore, in this study discusses to identify and rank indicators of intellectual capital in higher education institutions from perspective of faculty members. From applied goal and method point of view, this research is descriptive-scaling research. This research was conducted at the University of Sistan and Baluchestan in two steps: The first step was to identify indicators to measure intellectual capital. That in this step, 14 indicators, has the greatest impact on the University of Sistan and Baluchestan. And also in this step the results of the statistical analysis showed that there is a significant relationship between the underlying components of intellectual capital indicators. In the second step these indicators were ranked by collecting questionnaires which were distributed. Finally, the indicators were defined in three categories: a) human capital, b) the structural capital, c) relational capital. After this step, the indicators were ranked by a hierarchical analysis technique.

Key words: Intellectual capital; Institutions of higher education; Human capital; Structural capital; Relational capital

1. Introduction

With the revolution in information technology (IT) information community, network and the rapid progress of technology have changed community development patterns and today, knowledge, thinking and idea is the most important capital. Organizations attempt for keeping their survival to get knowledge (Chen and Xie, 2004). This attitude of knowledge-based business requires approach that considers intangible assets such as knowledge and competence of human resources, innovation, customer relations, organizational culture, practices and organizational structures. In this regard, the concept of intellectual capital (IC) has attracted attention of academic researchers and practitioners in the organization (Bontis, 1999). Given that today societies are moving towards a knowledge-based economy, knowledge is the most important element in creating value for organizations. That's why the most important economic theory of the second half of the twentieth century has approved existence of intangible element in organization and raised as part of the measures of economic growth. In such an economy that all of its parts have been establish base on the knowledge, universities play an active role

and continuous presence in all economic processes because of its key role in research parts. In fact, in the past decade, most of the analyses of knowledge management and intellectual capital have been done in the private sector; but now the motivation and passion for research on public organizations have been established such as universities and research centers. Focusing on public universities and research centers, knowledge management and intellectual capital management has become very important and therefore the authorities should strengthen their role in the national innovation. Because the most important inputs and outputs of universities have been intangible and only a small fraction of them identified (Nejati pishe and Mansuri, 2011).

Iran University Rankings are conducted by 5 general characters such as research, education, international reputation, facilities (amenities) and social-economic activities. The ranking authority of universities and research centers stated ranking of 5 Islamic Republic of Iran in 2013, respectively, as follows: Islamic Azad University, Tehran University, Tehran University of Medical Sciences, Sharif University and Amir Kabir Industrial University. Follow rankings were dedicated in 2013 to the Tarbiat Modarres University, Iran University of Science and Technology, University of Shiraz, Fredosi Mashhad University, Shahid Beheshti University of

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medical science. Until a few years ago, University of Sistan and Baluchestan has been evaluated in a number of country developing universities. Now, with measures in research- based which has been conducted at the University of Sistan and Baluchestan led the University as a Center of Excellence in the South East region of the country. Some development indicators of University of Sistan and Baluchestan in order to achieve specific objectives include educational indicators, research indicators and cultural-religious indicators. Since the University of Sistan and Baluchestan have not had plans to do anything with the intellectual capital so in the form of research performance examine intellectual capital.

1.1. Review of Literature

1.1.1. The evolution of intellectual capital

The first application of the intellectual capital concept back in the 60s. Concurrent with the development of the information age, there are structures, forms of communication and human

capabilities in the intellectual capital structure that includes the intellectual data, knowledge, information, concessions, licensing activities, and experiences when they combine together, or are placed side by side, they will be a source of organizational wealth (Zanele, 2004). Today the emerging field of intellectual capital becomes an exciting topic for both researchers and practitioners of organization. . Today in various fields, several attempts observe to employ the concept of intellectual capital. For example, accountants will to measure it on the balance sheet, IT professionals seek to code it in information system, social scientists tend to balance the power with it, psychologists want to develop mind, human research managers calculate investmen treturn through it and staff training and development will to apply it in human resource development programs (Nazeri, 2011). To better understand of this new field, in Table 1, we tried to explain the evolution of aid which has been done for identifying, measuring and reporting intellectual capital.

Table 1: The evolution of intellectual capital concept

Time period	Progress (development)
Early 1980s	General idea of intangible value was proposed which often called capital intellectual.
Mid 1980s	The information came into existence, and the gap between book value and market value is considerably increased for many companies
late 1980s	The first attempts were writing and compiling the accounts that measure intellectual capital (Sveiby, 1988). And initiatives that systematically measure company's intellectual capital and report to outside groups (selmi, 1988)
Early 1990s	In 1990 the Skandia company appointed Lif Edvinson as director of intellectual capital.
Mid 1990s	Nonako and Takuchi 1995 introduced their valuable about knowledge-creation company. This book focuses on Knowledge, however, the distinction between knowledge and intellectual capital is very intangible. Also in 1994, an addendum was prepared for the annual report Skandia company that showed its intellectual capital stock. intellectual capital report created interest in Skandia company following (Edvinson and Malon, 1997)
Early 2000s	The first magazine was published by "Intellectual Capital" title. Intellectual capital perspective form with intellectual capital committee in the Skandia company. The "Intangible assets" book was published by "Brookings" Institute. Europe Union published first "intellectual capital" report.

1.1.2. Intellectual capital components

Intellectual capital component have been classified in various methods, although tripartite classification of wide extent certainly accepted in specialized literature more. Intellectual capital in university is formed from three main components which are closely linked together, the following is :

1.1.3. Human capital

The gained tacit and explicit knowledge value of university administrative part (teachers, researchers, administrators and administrative services and staff) include their activities through formal and informal training and retraining processes (Corcoles, Penalver and Ponce, 2011).

Human capital represents amount of person's knowledge in organization. Bents believes that human capital as a source of innovation and modernization strategic and it has special importance. Broking believes that the human assets of an organization include skills, expertise, problem-solving ability and leadership styles (Alavi and Qereshi, 2007).

Human capital consists of the knowledge, skills and abilities of employees. Human Capital form combine capabilities of Employees in an organization that help organizations solve business issues. Human capital is internal capital among individuals and organizations are not capable of acquisition and ownership them. So there is a risk for organizations if people leave them, the assets of the organization will be out. Hence, human capital has a direct correlation to how the use of these assets by the creativity and innovation for the

improvement of these assets (Khavandkar; Khavandkar and Motaghi, 2008).

1.1.4. Structural capital

Betis et al. (2000) define the structural capital of the organization consist of all non-human knowledge repositories in organization which include databases, organizational charts, procedure, guidelines, and anything that give more worth than tangible assets (Haji karimi and Bothayi, 2009).

Structural capital can be referred to anything that exists in the organization and support the employees (human capital) in their work. Structural capital is under the organization ownership, even when employees leave the organization, it exists there (Lopez, 2008).

Human capital is a major factor in the development of structural capital therefore it is related to human capital. In fact, it is a knowledge that is remained at the organization when employees go home at night, (Nazari and Hermans, 2007).

1.1.5. Relational capital

In addition, the Roos and the Roos argue that relational capital; include relationships with stakeholders inside and outside the organization (Roos and Roos, 1997). Also, Chen et al classify customer capital in the form of marketing capability, severity marketing and customer loyalty. This attitude has effect on service function, relationships between employee satisfaction, customer

satisfaction, customer loyalty and financial performance (Chen et al, 2004).

Relational capital consists of the total assets which organizes and manages relationships with the environment. This asset includes the company's relationships with customers, shareholders, suppliers, competitors, government, public institutions and society (Moneveryan et al, 2006).

2. Assessment models of intellectual capital in universities and institutions of higher education

Since the concept of intellectual capital has been planned to make it possible to measure intellectual capital in organizations, the theorists, researchers, some public and private organizations, associations and societies have begun efforts to promote creation models with a assess capital thinking goal, after planning first related model with the measurement of intellectual capital model till now more than 65 available models are known in the field of higher education and research and there is very limited tools to measure and manage them.

In this model, the intellectual capital is described for universities and institutions of higher education. Sub-parallel with the strategic objectives of university is defined for each component of intellectual capital such as human, structural and relational components (Babayi et al, 2012).

Academic intellectual capital assessment model of Skandov et al. (2010).

Sub components: strategic objectives of intellectual capital components

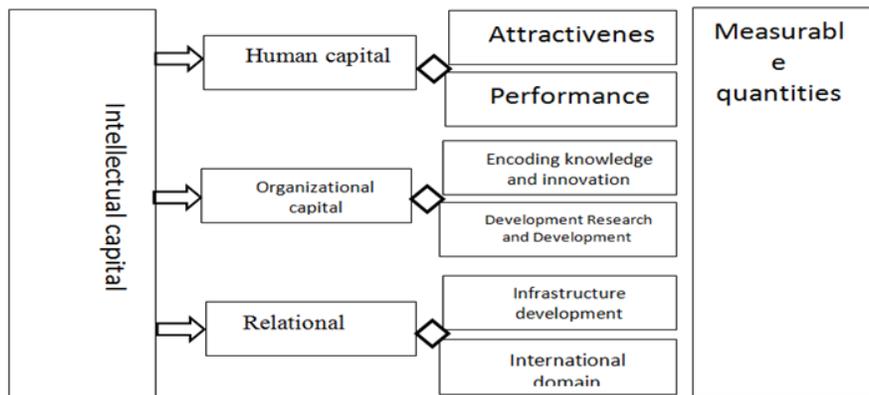


Fig. 1: The relationship

2.1. Lightner intellectual capital assessment model (2002)

Lightner (2002) has developed academic intellectual capital assessment model based on the systematic approach with regard to the three main components of intellectual capital. In this model, awareness of university administrators in recognizing "the components of intellectual capital" attract their attention to their political and organizational goals, and then, according to the three

components of intellectual capital, he presents framework for Capital insensible University Assessment. Functional processes in this model and impact of intellectual capital assessment play important role in internal and external stakeholders of university (Bezhan, 2010). Outline of the model is shown in Fig. 2

2.2. Measurement model of intellectual capital in universities and research organizations in the Madrid community

This model has been graded in three components, selected indicators for evaluating research results are organized in three different levels. The goal of model is to estimates the important intellectual capital variables for organizations and research activities are conducted by these institutions as

result intellectual capital give attention to them. It is also interesting that research processes enter with resources (inputs) in order to achieve the results (outputs) and tries to evaluate the link between them.

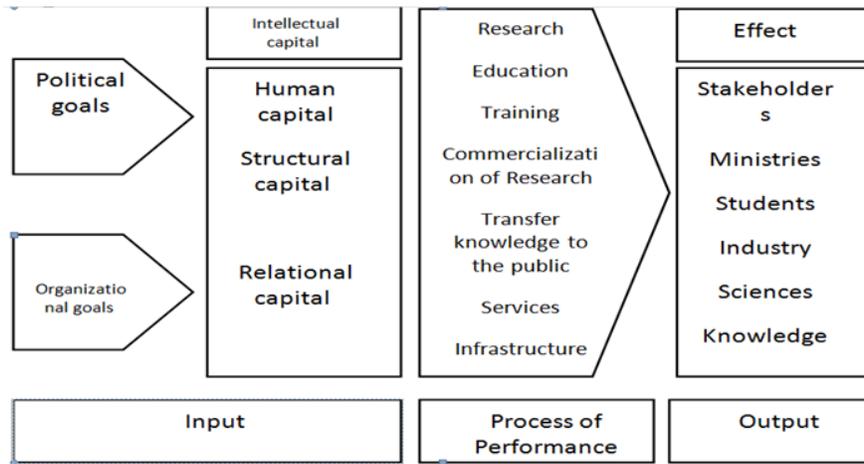


Fig. 2: The process performance

In summary, this model is trying to: Stabilize general characteristics of the research processes in the organization. Strengthen cause-effect relationship between the inputs and outputs in the research processes.

Suggests ways to manage intellectual capital inputs to improve research outputs in universities and research centers. (Dadashi khas and Babayi, 2010).

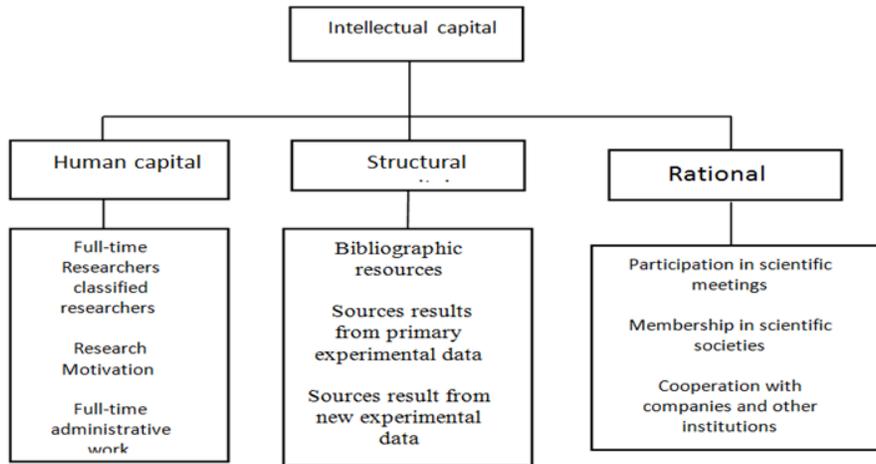


Fig. 3: Structure of intellectual capital for research activities in universities and research organizations in Madrid (Beono, 2002)

2.3. Conceptual model for evaluating the intellectual capital at universities and institutions of higher education in Iran

First view of conceptual model is to evaluate intellectual capital of universities and institutions of higher learning in the knowledge management context if we mean knowledge management as "the art of creating value for intangible assets" (Sveiby, 2001). However, view of conceptual model is described. The first step is to edit University's vision evaluation of intellectual capital. The second step in evaluating the intellectual capital of universities

edits strategic objectives in this area. The next step is to recognize the intangible assets of University for evaluating. Edit of indicators and performance evaluation process should be regarded as the heart which is done with three major components: human, structural and relational, index, sub-editing indicators and assessment process. Finally, the evaluation of assessment results and utilization, strengthening and protecting of intellectual capital aim to assess planning cycle and Efforts to exploit intellectual capital assessment result of university and planning of recruitment and protection of investments university system.

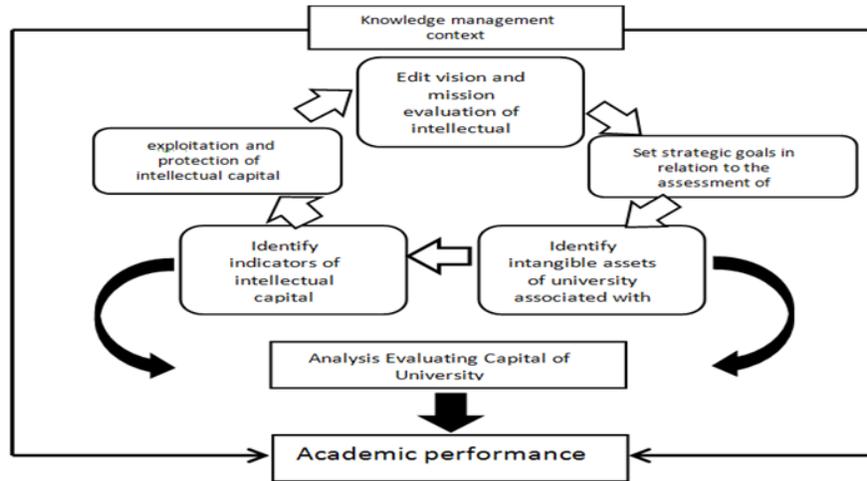


Fig. 4: Evaluation of intellectual capital in higher education model (Salimi and Rasian, 2011)

3. Theoretical framework and research questions

As seen in the Fig. 5, research analytical model guides the researcher in collecting and analyzing information, so it is presented as a model.

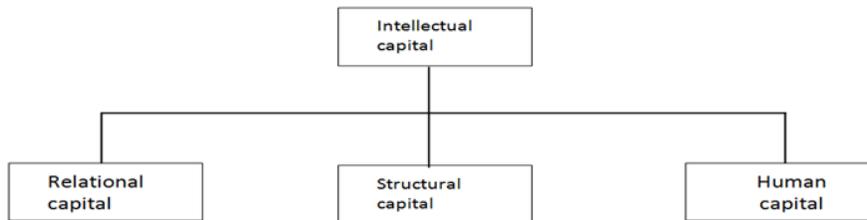


Fig. 5: research analytical model

The first question: what are intellectual capital evaluations indicator from faculty member's view at Sistan and Baluchestan University?

Second question: Is there any significant relationship between the infrastructure components of intellectual capital evaluation indicators?

Third question: how is a rank intellectual capital evaluation indicator from the faculty member view at University of Sistan and Baluchistan?

4. Methodology

The present study is a descriptive-survey research methodology and researcher follow library study, Internet research and survey of faculty members to identify mechanisms to promote the University of Sistan and Baluchestan intellectual capital, so the purpose of this research is an applied research. As well as the research done by means of questionnaires.

4.1. The population

The population of the study is 306 faculty members at University of Sistan and Baluchestan.

4.2. Sample

Among faculty member, administrators, staff and students of the University of Sistan and Baluchestan, faculty members were chosen because of being expert in judgment method so we used judgmental and available sampling to select a sample. For this reason, the 60 questionnaire were given to faculty members of the University of Sistan and Baluchestan, which covers about 20% of population. And 53 questionnaires were returned.

4.3. Data collection and method

Data collection methods placed into two categories:

(1) Direct methods, such as observation, interviews, and questionnaires and...

(2) Indirect methods, such as use of documents

The main technique which was used in this study is a questionnaire survey.

4.4. Validity and reliability Assessment Tool

The most important collecting information tool in present study is questionnaire; therefore, the validity and reliability questionnaire is important. The content validity methods were used to estimate ultimate validity questionnaire and some criteria were considered in this context: First, apply

indicators which were used previously in other studies; Second, the opinions of experts as well as professors and advisors to select appropriate indicators were used. The results of this work, modify, and delete a number of indicators and fit them to the college. The questionnaire indicators were designed in a way that represents the components of intellectual capital. The purpose of reliability assessment questionnaire is to understand how much gauges has extent to generalize the statistical community. Reliability of identification stage was calculated by using Cronbach's alpha and software spss, 959 /. Trust and standard reliability

AHP is measured by inconsistency rate. Inconsistency rate rankings for all indicators in this study gained 07/0 .

5. Analysis of research questions:

The first research question

What are intellectual capital evaluations indicator from faculty member's view at Sistan and Baluchestan University?

Table 2: identified Indicators from the perspective of faculty members

Human capital	- Ratio of the total number of researchers in the University Personnel - Higher degree of education indicator among the academic staff - Growth of Higher Education indicator - Promotion of faculty members indicator in higher
Structural capital	- Assignment of research projects to faculty members - Assignment of research grant to faculty members - published articles in ISI - published articles in the full Proceedings of prestigious conference academic -Research - published articles in Proceedings of prestigious conference academic-extension
Relational capital	- The presence of faculty members at Conferences - Presentations at scientific meetings - Conferences and seminars - Specialized workshops and exhibitions - Provide advice on the dissertation

The second research question is there any significant relationship between the infrastructure components of intellectual capital evaluation indicators?

The Kolmogorov – Smirnov statistical test is used for determining the relative frequency of data. Considering non-normal distribution of the data, Spearman correlation test was used to understand relationship between underlying factors of evaluating intellectual capital indicators.

Because of this test is usually considered 5% error level, less than 5% show significant levels of correlation coefficient. Thus, we can conclude that there is a significant positive correlation between the underlying components of intellectual capital and changing in order to improve each of the components can lead to improvements other components, or vice versa. If the components situation as expectation become to somehow change, the status of other components are also affected.

The third research question: How is a rank intellectual capital evaluation indicator from the faculty member view at University of Sistan and Baluchistan?

6. Conclusions

Intellectual assets are especial for any organization, so, there is no homogeneous evaluating models and measurement intellectual capital at universities. Hence, each university base on forms and special ownership environment must define the

best tools for the assessment and management of intangible assets. Measuring intellectual capital in higher education can help to identify comparative and competitiveness advantages of university and the strengths and weaknesses of the educational system. In this research, intellectual capital indicators include indicators of human capital, structural capital and relational capital. There are 4 indicators for human capital, 5 indicators for structural capital and relational each were identified and the reliability of identification stage was calculated 959/0 by using the software SPSS. Obtained weight from the AHP methods indicate result that human capital has the highest priority than other groups and Structural and relational capital indicators is next in rank. Inconsistency rate rankings for all indicators in this study were 07/0. Due to the relatively high preference for the first group compared to other groups, its indicators naturally dedicate high indicators to itself by rankings, respectively.

7. Recommendations

7.1. Recommendations regarding human capital

- The appointment and promotion of faculty members based on their employment and relationship with the scientific and academic fields
- Provide education, counseling and educational opportunities to help improve academic university staff who have a good performance

- provide virtual learning Systems and specific academic fields

- Provide context for promotion of faculty colleagues ranking

Table 3: Final weights, ranking in sub-group, final rating of 14 sub-indicators of the intellectual capital of Sistan and Baluchistan base on hierarchical analysis technique

indicators	Indicators weight	Sub-indicators	Sub-indicator in sub-group	Ultimate weight	Rank in sub-group	Ultimate rank
Human capital	5010/	Ratio of the total number of researchers in the University Personnel	3060/	1490/	2	2
		Higher degree of education indicator among the academic staff	1810/	0880/	4	6
		Growth of Higher Education indicator	190/	0930/	3	4
		Promotion of faculty members indicator in higher	3230/	1570/	1	1
Structural capital	30/	Assignment of research projects to faculty members	3020/	0940/	1	3
		Assignment of research grant to faculty members	2840/	0890/	2	5
		published articles in ISI	2210/	0690/	3	7
		published articles in the full Proceedings of prestigious conference academic -Research	1250/	0390/	4	10
		published articles in Proceedings of prestigious conference academic-extension	0690/	0220/	5	13
Rational capital	1990/	The presence of faculty members at Conferences	3130/	0630/	1	8
		Presentations at scientific meetings	3050/	0610/	2	9
		Conferences and seminars	1750/	0350/	3	11
		Specialized workshops and exhibitions	0950/	0190/	5	14
		Provide advice on the dissertation	1120/	00288	4	12

7.2. Recommendations regarding structural capital

- Provide, activate and develop University Press unit and dedicating annual budget to this unit
- Dedicate grant to faculty members for increasing the number of articles are published in scientific journals
- Development of research projects with faculty members, especially through contracts with other institutions

7.3. Recommendations regarding relational capital

- Create order and harmony in order to perform ceremonies, seminars and conferences by special committees
- Coagulation the scientific and research agreements with various foreign universities and international research institutions, professors and researchers to develop creativity and motivation

- Participation of faculty members in international conferences, international mobility and participation in global knowledge production

- Raising supervisor's scientific abilities, in order to communicate and interact more constructively with students in the process of doing research, understanding each other properly.

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