Investigate of Intellectual Capital in Nonprofit Organizations (NPOs)

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Authors' contributions

This work was carried out in collaboration between all authors. Author RN designed the study and wrote the first draft of the manuscript, author FG performed the statistical analysis. Author NA wrote the protocol, managed the analyses of the study and literature searches. All authors read and approved the final manuscript.

ABSTRACT

Aims: In recent decades, the management of the intellectual capitals has turned into one of the noteworthy and appealing issues. The main objective of the present research was to evaluate the components of intellectual capitals in nonprofit organizations. To this end, Procurement, Development and Renovation Organization of schools of Tehran province, which is considered as a nonprofit organization, was selected as the statistical population.
Study Design: Research paper.
Place and Duration of Study: In order to investigate the threefold components of intellectual capital, a nonprofit organization was particularly selected. The main activity of this organization is Construction of school buildings in order to achieve society educational goals. This research was done since September of 2012 to February of 2013.
Methodology: Therefore, at the initial stage theoretical study was carried out through library studies. Considering the fact that the research method applied was of descriptive type, the instruments employed for data collection was interviewing and questionnaire. The questionnaire includes 40 items and is adapted from a standard questionnaire that are cited in the Appendix A. This questionnaire was then distributed among the samples who were computed to be 124 (100 Men, 24 Women, age range24-68 years) participants utilizing Cochran formula. In order to test the hypotheses, structural equation modeling technique and PLS software have been employed.
Results: The results obtained from the concurrent studying on the components of

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intellectual capital on each other in the above-stated organization indicated that human capital has a large effect on the structural capital while human capital showed no relationship with relational capital. Also, structural capital has a significant impact on relational capital.

Conclusion: According to the resource-based view, the resources are considered as worthwhile that lead to efficiency development and potential investment in opportunities and confronting threats. With respect to the resource-based view and that structural and relational capital present at an acceptable level, the lack of human capital component indicates that human resource as a valuable source in the organization studied does not have proper planning and has not yet received a rightful place in the organization.

1. INTRODUCTION

Following the move from the industrial age to the informational, knowledge, information era and all items of intangible assets have played a critical role in the management[1] [1]. In this regard, body of knowledge in organizations has been emphasized by many. Body of knowledge in organization refers to the organizational capacity in the field of stimulating innovation and its correct management and in case of sufficient attention to the body of knowledge, organizations can gain competitive knowledge[2] [2]. Intellectual capitals were regarded as a part of intangible assets which cannot be considered in the financial statements; whereas, the contributions of intellectual capital to the managerial, social and technical advancement has been to the extent that it has been regarded as the main factors creating value; so that, along with strategic management concepts such as Balanced Score Card[3] [3] model and Learning Organization[4] [4] and other concepts, the concept of intellectual capital is considered as the most efficient means of strategic management in the nonprofit sector and an important resource for sustainable strategic advantage. It is evident that the operation of nonprofit organizations is intended as a basis for other organizations[5] [5]; thus, evaluation, management and exploitation of the intellectual capital of such organizations are of crucial importance[6] [6].

In general, assessing and studying of intellectual capital using three components that comprise it are as follows:

- Human capital: is the individual knowledge, skills, abilities and experiences of employees in an organization to create value and solve organizational issues.
- Structural capital: refers to the existing structures and processes within an organization by which employees apply their knowledge and skills.

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[1]*Alvani, M., 2009, General management. Tehran, Ney Publication, Thirty-fourth edition.*
[2]*Kong, E. 2007, The strategic importance of intellectual capital in the non-profit sector, school of commerce, vol. 8 No.4, pp. 731-721.*
[3] *Norton & Kaplan*
[4] *Pitter Senge*
[5]*Backman, E.V., Grossman, A. and Rangan, V.K., 2000, "Introduction", Non-profit and Voluntary Sector Quarterly, Vol. 29 No. 1, pp. 2-8.*
[6]*Barman, E.A., 2002, Asserting difference: the strategic response of non-profit organizations to competition, Social Forces, Vol. 80 No. 4, pp. 1191-222.*

- Relational capital: is defined as the knowledge generated from communication within the organization, between organizations, shareholders and suppliers.

In order to manage intellectual capitals, the threefold components of the intellectual capital shall be correctly evaluated. The present paper is an attempt to evaluate the components of intellectual capital in nonprofit organizations. To accomplish this purpose, a nonprofit organization was particularly selected.

Table 1. Technical chart

Universe	Equipping, development and modernization of schools organization in Tehran province
Geographic Range	Local
Information gathering method	Personal survey and secondary data
Sample unit	Department and civil engineers
Population census	184
Sample size	124
Reliability level	%99: Z=1/96، p=q= 0/5
Date of the field study	The survey carried out in September and October 2012

Source: Carried out by the author

The research hypotheses are:

First hypothesis: the component of human capital has a significant impact on relational capital components.

Second hypothesis: the component of human capital has a significant impact on structural capital components.

Third hypothesis: the component of structural capital has a significant impact on relational capital components.

2. METHODOLOGY

A true nonprofit organization which includes various sections was taken into consideration to investigate the issue. Any of the provisions of these sections have different values and practices; therefore, in line with obtaining results that can be interpreted, a section with almost similar features was selected for data collection. The section comprises of people sharing similar academic education and also almost similar tasks. To this end, civil engineers and architectures of the organization were investigated as the target population.

Statistical data were collected using a questionnaire and the validity of the data was assessed employing structural equation model[7] [7] techniques. Education and experience of people who participate in data collection process, is civil engineering and architecture, that details are described in Table 2.

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[7]*Ghasemi, V., 2010, A Beginner's Guide to Structural Equation Modeling, 2end edition.*

Table 2. Descriptive statistics for reliability estimates for concept mapping

	Number	Description		
Education	120	**Bachelor**	**Masters**	**Ph.D**
		64%	33%	3%
Age	120	Min		Max
		24		68
Experience	120	2		35

Source: Carried out by the author

In the present paper, the questionnaire used as aiming at evaluating intellectual capital in the organization under study is adapted from a standard questionnaire[8] [8] in this field. The questionnaire items were derived from the following conceptual model:
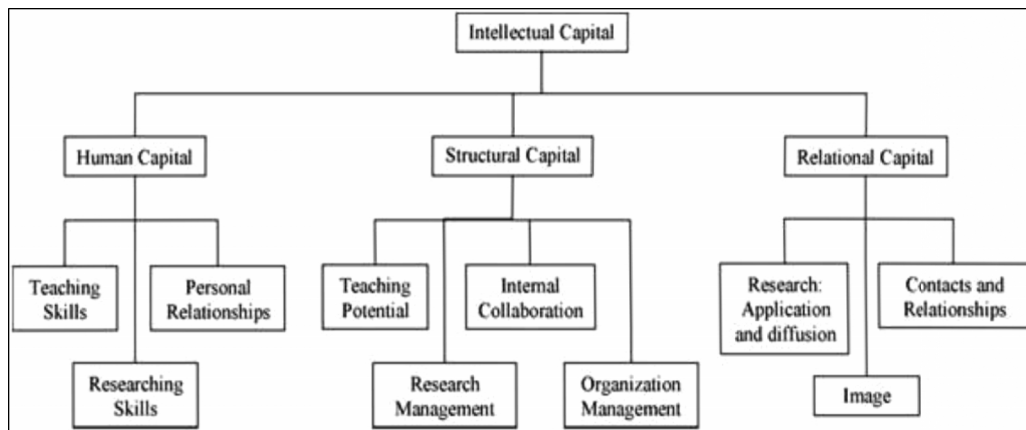

Fig.1[9]. Components of intellectual capital in non-profit organization [9]

The data obtained from collecting the questionnaires were analyzed employing structural equation model techniques.

Structural equation modeling is a powerful multivariate technique from the family of multivariate regression or rather it is the extension of the general linear model which allows researchers to simultaneously examine a series of regression equations. Structural equation modeling is a holistic approach for testing hypotheses about the relationship between the observed and latent variables.

In order to analyze the structural equation modeling, methods of analysis of covariance and partial least squares can be utilized. The present paper has been conducted employing Partial Least Squares Method.

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[8]*M.R. Martinez-Torres, "A procedure to design a structural and measurement model of Intellectual Capital: An exploratory study", University of Seville, 2006, pp.617-626.*
[9]*M.R. Martinez-Torres, "A procedure to design a structural and measurement model of Intellectual Capital: An exploratory study", University of Seville, 2006, pp.617-626.*

In this paper, raw data and initial information using descriptive statistical techniques[10] [10] were abridged in the form of table and chart.

Afterward, with the help of these tables and charts, the questionnaire and its items were analyzed and statistical computations in structural equation model technique employing PLS software were undertaken.

2.1 Introducing the Model

With regard to the nature of the object of study and a conceptual model of the research, the following model that present in Fig. 2, was derived in this form to analyze the gathered data. In this model some criteria are intended for the sake of measurement. The information related to these criteria were gathered through the mean of questionnaire and then analyzed utilizing structural equation model technique and PLS software. In the following, after introducing the model and its components, the shape of the model is depicted as well.
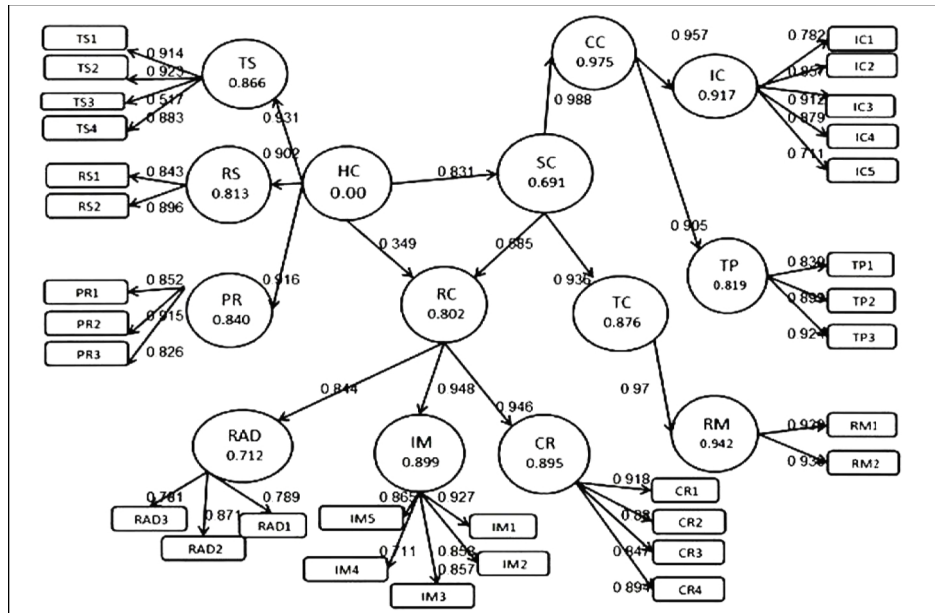

Fig. 2. Result
Source: Carried out by the author

As it is elicited from this model, intellectual capital is comprised of three sections each of which are measured based upon the related criteria. Indeed, such criteria are a basis for designing the questionnaire items. After developing the items, gathering the questionnaires and primary classification of the data using descriptive statistics technique, the analyses of the data employing PLS software were performed. The criteria set forth in the above model are introduced in chapter three; continued, to focus more precisely on the model again they will be specified separately.

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[10]*Azar, Adel, 2005, "Statistics and application in management". Tehran, The Organization for Researching and Composing University Textbooks in the Humanities (SAMT).*

Since the statistical evaluation and computations of this research are carried out relying on the structural equation model technique; thus, the model variables are studied in two sections:

- Structural section (Located in the center of the model.)
- Measurement section

In structural section there are three main research variables which include:

- Human capital
- Structural capital
- Relational capital

In the measurement section, there are some variables considered separately in order to evaluate the variables in the structural section; all of which will be individually brought up in what follows.

Variables related to human capital measurement

- Teaching skills
- Research skills
- Personal relationship

Variables related to structural capital measurement

The theoretical foundation of intellectual capital acknowledges that organizations undertake various methods to convert human capital into structural capital so that they can institutionalize the benefits obtained from human capital in the organization. Furthermore, the literature on intellectual capital outline the structural component as the most important and complex part of the intellectual capital. To this end, in order to precisely evaluate the structural component, it is required to study it in two levels named complex structure and general structure.

Variables considered in the evaluation of these two levels are:

The Complex Construct:

- Internal collaboration (IC)
- Teaching potential (TP)

The total construct:

- Research management (RM)

Variables related to the relational capital measurement:

- Researching: application and diffusion (RAD)
- Image (IM)
- Contacts and relationship (CR)

The model derived out of the data analysis employing PLS software is displayed in the figure below. In what follows, after presenting the model, analysis procedure will be described.

In order for the statistical analyses of the above model, the measurement section should be first evaluated; next, using the results obtained from this section, the structural section of the model will be studied. Hence, initially the technical features of the measurement model will be studied and then using its results, the structural model will be commented on.
Evaluating technical features of the measurement model:

Table 3. Statistical highlight

Construct	Composite reliability	AVE	Construct	Load	AVE	Indicators	Load
HC	0.93	0.606	TS	0.75	0.68	TS1 TS2 TS3 TS4	0.84 0.85 0.51 0.80
			RS	0.77	0.75	RS1 RS2	0.70 0.85
			PR	0.78	0.74	PR1 PR2 PR3	0.87 0.79 0.68
SC	0.95	0.63	IC	0.76	0.69	IC1 IC2 IC3 IC4 IC5	0.73 0.80 0.83 0.81 0.66
			TP	0.81	0.78	TP1 TP2 TP3	0.82 0.80 0.81
			RM	0.82	0.78	RM1 RM2 RM3	0.82 0.85 0.79
RC	0.95	0.61	RAD	0.83	0.66	RAD1 RAD2 RAD3	0.75 0.71 0.56
			IM	0.79	0.71	IM1 IM2 IM3 IM4 IM5	0.84 0.79 0.77 0.74 0.83
			CR	0.67	0.78	CR1 CR2 CR3 CR4	0.86 0.79 0.80 0.87

Source: Carried out by the author

The quality of the measurement model can be evaluated through reliability and convergent validity of the constructs:

To assess reliability, composite reliability coefficient (CR[5]>0/7) is utilized that in case the coefficients are appropriate, it can be stated that the questionnaire of the study is reliable. Convergent validity was assessed through the average variance extracted index (AVE6). Using these coefficients, the questions with loadings of less than 5/0 will be discarded so that the average variance extracted index reaches above 0.5. Factor loadings will be introduced as the indicators of the model suitability providing that the loadings are more than 0.5.

Studying the structural section of the model:

The goodness of fit[11] of the path analysis model:

In the PLS model which is based upon the variance, the geometric mean of two indicators of cumulative mean and the average squared correlation coefficients between constructs will be utilized.

In the present paper, the goodness of fit of the path analysis model equals to:

$$GOF=\sqrt{0/706*0/655}=0/680$$

In case the amount of GOF is equal or greater than 0.36, it can be said that the model is a significant and acceptable one. Since the results obtained from the mathematical computations of the overall fit of the path analysis model is greater than 0.36; therefore, it can be stated that the model is generally significant and acceptable.

3. RESULTS

In considering the research hypotheses, the path coefficients represent factor loadings which with regard to these criteria, decisions can be made as for rejecting or non-rejecting the research hypotheses.

With respect to the fact that the least amount acceptable for loadings of each of the measures is 0.5, therefore those measures with loadings less than this amount should be denied from further analyses.
Following, the model attained by employing PLS software will be used as an instrument for confirmation or rejection of the research hypotheses and to individually interpret the hypotheses.

3.1 The First Hypotheses. The Component of Human Capital has a Significant Impact on Relational Capital Components

As it is evident from the theoretical foundations of intellectual capital, it is regarded as the main and most vital component by which the structural and relational capitals could be strengthened.

Studying and analyzing of the data derived from the questionnaire indicate that the human capital component has been neglected in the organization; that is the zero on this component of the model is an indicator reveals it. Since human capital is the main

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[11] *Huber-Carol, C.; Balakrishnan, N.; Nikulin, M.; Mesbah, M. (Eds.), Goodness-of-Fit Tests and Model Validity 2002, XXXV, 507 p.*

component of the intellectual capital, hence it will influence other components either directly or indirectly.

Evaluating the model in PLS software demonstrates that the loading of human capital on relational capital is 0.349 and since it is less than 0.5; thus, it is not worthy of proper interpretation. In other word, evaluating the components of intellectual capital in the organization revealed that the human capital was not profitably exploited to foster rational capital. Consequently, the first hypothesis "the component of human capital has a significant impact on relational capital components" was not proved when analyzing thus it is rejected.

3.2 Second Hypothesis: The Component of Human Capital has a Significant Impact on Structural Capital Components

Studying the model displayed that the loading of human capital to structural capital is, 0.831. According to the theoretical basis of intellectual capital, the structural capital is the same as human capital which has been flowed in the organizational practices and strategies; in other word, it has been owned by the organization to the extent that it can be inserted into the financial statements of the organization such as patent rights and etc.
Since 0.831 is greater than 0.5, therefore there is a significant relationship between human and structural capital. As a result, this hypothesis "the component of human capital has a significant impact on structural capital components" will be confirmed.

3.3 Third Hypothesis: The Component of Structural Capital has a Significant Impact on Relational Capital Components

The loading of structural capital over relational capital is 0.585 which is a little more than 0.5; hence, it can be concluded that the relational capital in the organization is affected by capital structure meaning that when the structural capital of a unit is improved, it will result in an increase of 0.858 in the relational capital.

As a result, the third hypothesis "the component of structural capital has a significant impact on relational capital components" is also confirmed.

Table 4: Research hypotheses

Result	(Factor loadin)	hypotheses
reject	0.349	The component of human capital has a significant impact on relational capital components.
non-rejecting	0.831	The component of human capital has a significant impact on structural capital components.
non-rejecting	0.585	The component of structural capital has a significant impact on relational capital components.

Source: Carried out by the author

4. DISCUSSION

The results obtained from the researcher's studies indicate that the human capital component has a high impact on the structural capital and also structural capital affects relational capital. However, in the organization studied, in this research showed that the human capital and relational capital have little interaction with each other. While the majority of researches conducted in the field of intellectual capital it was revealed that the human capital component is the most important factor affecting such as structural capital and relational capital.

To compare the results with a number of other research results, the following can be mentioned:

In an article entitled "The strategic importance of intellectual capital", all the components of intellectual capital considered to have interdependency which both affect and are affected by each other. Whereas according to the results of the present study; the relationship between human capital and structural capital as well as the relationship between structural capital and relational capital are one-way and there is no significant relationship between human and relational capital.

In another survey, the relationship among the components of intellectual capital and knowledge and socio capital management was investigated. It indicated a positive and significant relationship between the variables. A couple of other researchers[12] also studied the components of intellectual capital from the point of view of culture and regarding where it stands in the organization.

At the end, it is worth mentioning that the investigations conducted in the current paper are in line with the studies of an article entitled "The design of structural model and intellectual capital measurement"[13] and it studies the interrelationships between the components of intellectual capital.

Considering several studies in the field of intellectual capital and their management, it can be concluded that in the age of modern science it is essential to identify the intellectual capital frameworks associated with IT and the nature of organizations activities. To take advantage of these assets, we must evaluate them properly.

Finally, evaluating the components of intellectual capital in the organization at present study revealed that the human capital was not profitably exploited to foster rational capital.

5. CONCLUSION

As it was mentioned in the theoretical basis underlying the research, the intellectual capital comprise of three major components including human, structural and relational capital. The present results indicate that the structural and relational capitals exist at an acceptable level in the organization and they interact with one another. However, due to its importance and the profound impact on the other two components, human capital requires more of the attentions which were unfortunately neglected in the organization under study. The purpose of the concept of human capital is knowledge, skills and the information contained in the

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[12] *Sanchez*
[13] *Torres, M. Martinez*

organization's human resources; that in the perspective named strategic management of human resource all the knowledge and skills present in an organization are not strategic. To this end, determining human capital available in the organization and that how they can be regarded as a source to create a sustainable advantage for organization is of crucial importance.

According to the resource-based view, the resources are considered as worthwhile that lead to efficiency development and potential investment in opportunities and confronting threats[14]. With respect to the resource-based view and that structural and relational capital present at an acceptable level, the lack of human capital component indicates that human resource as a valuable source in the organization studied does not have proper planning and has not yet received a rightful place in the organization.

Human Resource management field can play an important role in upgrading the capabilities and capacities of the components of intellectual capital.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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[14] *Choon Kang, S.. 2005, Intellectual capital architectures and bilateral learning: A framework for human resource management, Cornell University, Vol. 187, pp. 5-14.*

APPENDIX A. INDICATORS

Teaching skills

E1 Programmed learning of the departments subjects are updated.
E2 Preparing classes is a value from the culture of the department.
E3 The different programmed learning of the departments subjects are coordinated.
E4 Results derived from researching are made known to everybody in the department through seminars, conferences, etc.

Researching skills

E5 Percentage of Researching and Teaching Staff (RTS) who has PhD in the department.
E6 Percentage of researching economic complements in the department.

Personal relationships

E7 Personal relationships are good in the department and they generate a good job environment.
E8 There are professional collaboration between people in the department.
E9 There is internal cohesion in the department.

Teaching potential

E10 Teachers from the department has gone to courses, seminars, conferences, etc. in order to improve there formation during the last year.
E11 Teaching innovation can be found in the department by using new technologies (web pages, student help by e-mail, etc.).
E12 There are subjects manuals (books, problems, cases of study, etc.) to guide students' learning.

Research management

E13 Production of Ph.D.
E14 Average size of researching groups.
E15 Points given to the researching group by the PAI (Researching Andalusia Plan).

Internal collaboration

E16 Criteria for selecting people, for internal promotion, etc. are stable and known by everybody in the department.
E17 The number of Departments Meetings celebrated in a year are good.
E18 Departments commissions are operatives.
E19 The results arrive by the departments commissions are made known to everyone in the department and they are support by the department directorate.
E20 Information of general interest is accessible to everyone in the department.

Organization management

E21 The department directorate encourage relationships through extra-departmental activities (informal meetings, launch, etc.)

Contacts and relationships

E22 The department collaborates in organizations of congress, seminars, conferences, courses, etc.
E23 The department collaborates with other university departments.
E24 The department collaborates with other private entities [firms, NGO (no governmental organizations), etc].
E25 The department collaborates with other public entities different from the university.

Image

E26 The department is concerned with showing a uniform corporative image.
E27 How much information do you have about the image of the department in the Faculty?
E28 The image of the department in the Faculty is good.
E29 How much information do you have about the image of the department outside the Faculty?
E30 The image of the department outside the Faculty is good.

Researching: application and diffusion

E31 Teachers in the department goes to researching seminars, congress, courses, meetings, etc. annually.
E32 Someone in the department makes an stay in other centre as a visitor professor (or similar) during four months at least.
E33 Courses included into the doctorate programmed learning fit with the basic researching lines in the department.

Total construct

E34 Organization upgraded by the new idea.
E35 Develop internal relationships between various groups by the organization.
E36 Increase the use of organization knowledge when Employees formed in groups.
E37 Replace the appropriate staff instead of who have left the organization.

Complex construct

E38 Employees are more creative.
E39 Employees of organization are satisfied.
E40 Support innovation by the organization.