

**CONNECTIVE NETWORK OF SOCIAL CAPITAL AND HIGHER EDUCATION IN IRAN**

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**ABSTRACT**

In recent years many studies have been done by sociologists, economists, politic experts and policy makers on social capital, howeverwe see a research void regarding the growth of social capital, regarding the universities' role, which attention to it is necessary for growth of social capital. Therefore in this study we attend to investigate the relation between social capital and higher education in Iran with descriptive method. Lastly regarding the effective diagnosed factors in this study based on a comprehensive model, it is necessary that managers and experts of educational institutes pay enough attention to them. In this case, benefitting from the designed model for promotion of social capital in educational centers and its effectiveness on other activities is recommended.

**KEY WORDS:** social capital, higher education, ministry of education, Fuzzy DEMATEL.

**INTRODUCTION**

In recent years, many studies have done by economists, experts of politics and policy makers on social capital, and different theorists and thinkers have given various definitions of social capital (Mcchean & Mcmillan, 2009). Woolcock (1998) regards social capital as information, trust and mutual norms that exist in social networks. Parallel to this, Johnson states that social capital is the very flow of persons' investment (Oxby, 2009).this investment is somehow intangible since it involves the relations of the person too and can be applied in individual, inter-group and intra-group levels (KruminaSoller, 2006: 12-13). Chen et al. (2008) define social capital as involving organizations, relations, attitudes, values, and norms that dominate persons' interactions and behaviors. As Ports and Landolt (2000) believe that universities and higher education institutes should train relational skills that include respect, trust, empathy and growth of expert people for different jobs in the society.

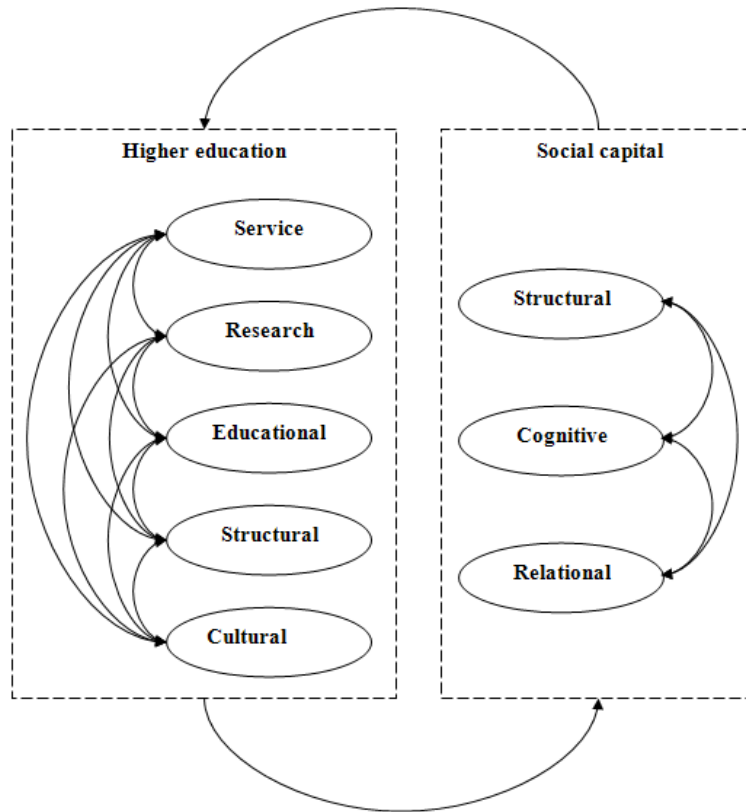
Therefore this important issue and the lack of sufficient research in the area of growth of social capital, regarding the role of universities and also the increasing growth of higher education institutes in Iran, is the main reason for formation of this research. Therefore, we attend to the research method and the ways of analysis and extraction of connective model of these two concepts in Iran.

**MATERIALS AND METHODS**

This study is applicable regarding the goals, quantitative regarding the data, and descriptive in regards to the research method. Since it has attended to the description and extraction of the aspects and components of higher education in growth of social capital, and presentation of a proper model for determining the stance of social capital growth in Iran's higher education system, in order to be able to take measures for the promotion and improvement of growth of social capital. The research society is all the members of the scientific board with the level of professor in the department of human and social sciences who were active in research work in 2013-2014, and based on Kukran formula, the sample was determined as 365 persons. For gathering the data we used standard questionnaire with Fuzzy DEMATEL method. The main software used for analysis was Excel.

**RESULTS**

Based on the data gained from the literature review the following connective model regarding the relations between social capital and higher education is present.



**Diagram1. The path of social capital variable in Amos software**

Regarding the views of the expert group and the basis of Fuzzy DEMATEL, the connective levels of the aspects of the two variables based on diagram 1, were extracted as seen in table1.

Table1. Integrative matrix of the views of expert group based on verbal variables regarding the connections between research variables

Social capital			Higher education					variable	
relationa l	cognitiv e	structura l	cultura l	structura l	educational	researc h	servic e	aspects	
L	VL	L	M	H	H	M	—	service	Higher educatio n
M	M	VL	VL	L	H	—	L	research	
H	M	L	VL	L	—	L	M	educationa l	
L	L	H	L	—	L	L	L	structural	
M	VL	VL	—	VL	VL	L	M	cultural	
L	M	—	NO	NO	NO	NO	NO	structural	Social capital
H	—	M	NO	NO	NO	NO	NO	cognitive	
—	H	L	NO	NO	NO	NO	NO	relational	

In case of converting, the above information to Fuzzy values, table 2, will be extracted.

Table 2, integrative matrix of the views of expert group based on Fuzzy values regarding the aspects of the research variables

$Z_\lambda$									
Social capital			Higher education					variable aspects	
Relational	Cognitive	Structural	Cultural	Structural	Educational	Research	service		
0.25	0	0.25	0.5	0.75	0.75	0.5	0	Services	Higher educated
0.5	0.5	0	0	0.25	0.75	0	0.25	research	
0.75	0.5	0.25	0	0.25	0	0.25	0.5	educational	
0.25	0.25	0.75	0.25	0	0.25	0.25	0.25	structural	
0.5	0	0	0	0	0	0.25	0.5	cultural	
0.25	0.5	0	0	0	0	0	0	structural	capit 1
0.75	0	0.5	0	0	0	0	0	cognitive	
0	0.75	0.25	0	0	0	0	0	relational	

$Z_m$									
Relational	Cognitive	Structural	Cultural	Structural	Educational	Research	service		
0.5	0.25	0.5	0.75	1	1	0.75	0	Services	Higher educated
0.75	0.75	0.25	0.25	0.5	1	0	0.5	research	
1	0.75	0.5	0.25	0.5	0	0.5	0.75	educational	
0.5	0.5	1	0.5	0	0.5	0.5	0.5	structural	
0.75	0.25	0.25	0	0.25	0.25	0.5	0.75	cultural	
0.5	0.75	0	0	0	0	0	0	structural	capit 1
1	0	0.75	0	0	0	0	0	cognitive	
0	1	0.5	0	0	0	0	0	relational	

$Z_u$									
Relational	Cognitive	Structural	Cultural	Structural	Educational	Research	service		
0.75	0.5	0.75	1	1	1	1	0	Services	Higher educated
1	1	0.5	0.5	0.75	1	0	0.75	research	
1	1	0.75	0.5	0.75	0	0.75	1	educational	
0.75	0.75	1	0.75	0	0.75	0.75	0.75	structural	
1	0.5	0.5	0	0.5	0.5	0.75	1	cultural	
0.75	1	0	0.25	0.25	0.25	0.25	0.25	structural	capit 1
1	0	1	0.25	0.25	0.25	0.25	0.25	cognitive	
0	1	0.75	0.25	0.25	0.25	0.25	0.25	relational	

Based on definition:

$$\tilde{a}_i = \sum_{j=1}^n \tilde{Z}_{ij} = \left( \sum_{j=1}^n \lambda_{ij}, \sum_{j=1}^n m_{ij}, \sum_{j=1}^n u_{ij} \right)$$

$$r = \max_{1 \leq i \leq n} \left( \sum_{j=1}^n u_{ij} \right)$$

Therefore based on that regarding  $\tilde{X}_{ij} = \frac{\tilde{Z}_{ij}}{r} = \left( \frac{\lambda_{ij}}{r}, \frac{m_{ij}}{r}, \frac{u_{ij}}{r} \right)$

The implementation and analysis of the structural model we would have:

$$\lim_{w \rightarrow \infty} \tilde{X}_{ij}^w = 0$$

$$\tilde{X}_{ij} = (\lambda_{ij}, m_{ij}, u_{ij})$$

In which:

$$X_u = \begin{bmatrix} 0 & u_{12} & \cdots & u_{1n} \\ u_{21} & 0 & \cdots & u_{2n} \\ \vdots & \vdots & \cdots & \vdots \\ u_{n1} & u_{n2} & \cdots & 0 \end{bmatrix} \quad X_m = \begin{bmatrix} 0 & m_{12} & \cdots & m_{1n} \\ m_{21} & 0 & \cdots & m_{2n} \\ \vdots & \vdots & \cdots & \vdots \\ m_{n1} & m_{n2} & \cdots & 0 \end{bmatrix} \quad X_\lambda = \begin{bmatrix} 0 & \lambda_{12} & \cdots & \lambda_{1n} \\ \lambda_{21} & 0 & \cdots & \lambda_{2n} \\ \vdots & \vdots & \cdots & \vdots \\ \lambda_{n1} & \lambda_{n2} & \cdots & 0 \end{bmatrix}$$

And as following we would have based on definition:

$$\tilde{T} = \lim_{w \rightarrow \infty} (\tilde{X} + \tilde{X}^2 + \dots + \tilde{X}^w) = X \times (I - X)^{-1}$$

$$\text{In which } \tilde{T} = \begin{bmatrix} \tilde{t}_{11} & \tilde{t}_{12} & \cdots & \tilde{t}_{1n} \\ \tilde{t}_{21} & \tilde{t}_{22} & \cdots & \tilde{t}_{2n} \\ \vdots & \vdots & \cdots & \vdots \\ \tilde{t}_{n1} & \tilde{t}_{n2} & \cdots & \tilde{t}_{nn} \end{bmatrix}, \quad \tilde{t}_{ij} = (\lambda_{ij}^{\prime\prime}, m_{ij}^{\prime\prime}, u_{ij}^{\prime\prime})$$

Therefore,

$$\text{Matrix } [\lambda_{ij}^{\prime\prime}] = X_\lambda \times (I - X_\lambda)^{-1}$$

$$\text{Matrix } [m_{ij}^{\prime\prime}] = X_m \times (I - X_m)^{-1}$$

$$\text{Matrix } [u_{ij}^{\prime\prime}] = X_u \times (I - X_u)^{-1}$$

Table 2 depicts these values.

Table 3, matrix of the intensity of (T) relations regarding the relations of the aspects of research variables

$$Matrix [m_{ij}^m] = X_m \times (I - X_m)^{-1}$$

Social capital			Higher education					variable aspects
Relational	Cognitive	Structural	Cultural	Structural	Educational	Research	service	
0.092	0.044	0.074	0.092	0.139	0.147	0.102	0.03	Services
0.122	0.116	0.03	0.007	0.055	0.136	0.013	0.056	research
0.156	0.117	0.07	0.01	0.056	0.02	0.053	0.09	educational
0.074	0.072	0.14	0.047	0.011	0.055	0.051	0.053	structural
0.098	0.019	0.012	0.008	0.014	0.018	0.051	0.088	cultural
0.053	0.091	0.01	0	0	0	0	0	structural
0.132	0.024	0.091	0	0	0	0	0	cognitive
0.019	0.132	0.053	0	0	0	0	0	relational

$$Matrix [m_{ij}^m] = X_m \times (I - X_m)^{-1}$$

0.243	0.191	0.207	0.172	0.224	0.238	0.189	0.086	Services
0.251	0.238	0.149	0.081	0.131	0.212	0.052	0.135	research
0.283	0.24	0.186	0.081	0.13	0.063	0.127	0.164	educational
0.203	0.195	0.248	0.114	0.048	0.134	0.124	0.129	structural
0.214	0.135	0.119	0.036	0.088	0.097	0.122	0.159	cultural
0.11	0.147	0.028	0	0	0	0	0	structural
0.187	0.05	0.147	0	0	0	0	0	cognitive
0.04	0.187	0.11	0	0	0	0	0	relational

$$Matrix [\lambda_{ij}^m] = X_\lambda \times (I - X_\lambda)^{-1}$$

0.602	0.543	0.536	0.423	0.441	0.458	0.457	0.329	Services
0.582	0.561	0.462	0.32	0.37	0.418	0.271	0.395	research
0.594	0.574	0.508	0.329	0.379	0.282	0.391	0.435	educational
0.545	0.524	0.523	0.353	0.257	0.382	0.381	0.393	structural
0.531	0.445	0.414	0.22	0.311	0.324	0.356	0.399	cultural
0.335	0.36	0.2	0.157	0.164	0.17	0.169	0.175	structural
0.379	0.23	0.353	0.162	0.169	0.176	0.175	0.181	cognitive
0.224	0.36	0.311	0.157	0.164	0.17	0.169	0.175	relational

Lastly, for three ranges of the intensities of general relations, we would need anti-Fuzzystation which based on definition is:

$$\tilde{n}_k^{def} = L + \Delta \times \frac{(m-L)(\Delta+u-m)^2(R-\lambda) + (u-L)^2(\Delta+m-\lambda)^2}{(\Delta+m-\lambda)(\Delta+u-m)^2(R-\lambda) + (u-L)(\Delta+u-m)}$$

In which  $L = \min(\lambda_k)$  ,  $R = \max(u_k)$  ;  $k = 1, 2, \dots, n$  ,  $\Delta = R - L$

Therefore based on data in table 3, we would have:

Table 4, Defuzzy matrix of direct and indirect relations regarding the relations of the aspects of research variables

Matrix of Defuzzy direct relations								
Social capital			Higher education					variable
Relational	Cognitive	Structural	Cultural	Structural	Educational	Research	service	aspects
0.295	0.242	0.256	0.215	0.257	0.27	0.234	0.133	Services
0.302	0.289	0.197	0.122	0.172	0.244	0.097	0.18	research
0.329	0.293	0.237	0.125	0.174	0.107	0.174	0.213	educational
0.256	0.246	0.29	0.157	0.091	0.176	0.17	0.176	structural
0.264	0.184	0.166	0.075	0.125	0.134	0.163	0.201	cultural
0.152	0.186	0.066	0.039	0.041	0.042	0.042	0.044	structural
0.221	0.088	0.184	0.041	0.042	0.044	0.044	0.045	cognitive
0.081	0.217	0.146	0.039	0.041	0.042	0.042	0.044	relational

For calculation of the hierarchy of penetrability and impressionability of the aspects of research variables we will have:

Table 5, the matrix of penetrability and impressionability of the aspects of research variables

The rate of system's interactions		Net impressionability		Penetrability		Impressionability		Aspects	Variable
Rank	Point	Rank	Point	Rank	Point	Rank	Point		
1	2.983	1	.865	5	1.036	1	1.191	Service	Higher education
3	2.57	2	.637	6	.966	3	1.603	Research	
2	2.714	4	.591	4	1.061	2	1.653	Educational	
5	2.505	3	.619	7	.943	4	1.562	Structural	
8	2.125	5	.5	8	.813	5	1.312	Cultural	
7	2.156	6	.93	3	1.543	8	.613	Structural	Social capital
6	2.455	7	-1.03	2	1.754	6	.71	Cognitive	
4	2.553	8	-1.25	1	1.901	7	.652	Relational	

Based on this, as it is seen, the aspects of higher education have higher rates of inner interactions. Also, as a result of the elevation of the net impressionability of this variable, it plays somehow the role of an independent variable for the higher education. As other results, we can mention the stance of the service aspect in higher education which is the most affective aspect in higher education's structure. In addition, the rate of the interactions of this aspect is also very important. Regarding the aspects of the social capital variable, the structural aspect has the highest rate of interactions, and the relational aspect is the most affective aspect of the dependent variable.

As a result of gaining the diagram of relations, we should mention that based on the values in table 4, we can conclude that all aspects are effective on one another with a certain coefficient, which regarding the operation viewpoint, the investigation and formal description of the reliability and validity of the presented model will be very difficult. On the other hand, complex connections cannot help researchers in predicting future events. Therefore, for reaching a more reliable and possible model, in this section we will attend to the analysis of the model based on direct relations disregarding the indirect relations. Therefore based on the highest digit in the matrix of indirect relations, we will modify the matrix of direct relations or the values in table 4. Based on this, if the filter value equals

$$F = \max_{1 \leq i \leq 8} \left( \sum_{j=1}^8 S'_{i \rightarrow j} \right) = 0.2115$$

For the direct modified relations, we will have:

Table 6. Defuzzyc matrix of direct modified relations of the aspects of research variables

Social capital			Higher education					variable
Relational	Cognitive	Structural	Cultural	Structural	Educational	Research	service	aspects
.295	.242	.256	.215	.257	0.27	.0234	0	Services
.302	.289	0	0	0	.244	0	0	research
.329	.239	.237	0	0	0	0	.213	educational
.256	.246	.29	0	0	0	0	0	structural
.246	0	0	0	0	0	0	0	cultural
0	0	0	0	0	0	0	0	structural
.211	0	0	0	0	0	0	0	cognitive
0	.217	0	0	0	0	0	0	relational

Lastly, based on the main goal of this study, we may suppose the levels of the relations of the studied aspects distinguished by the study's variables, as the diagram2.

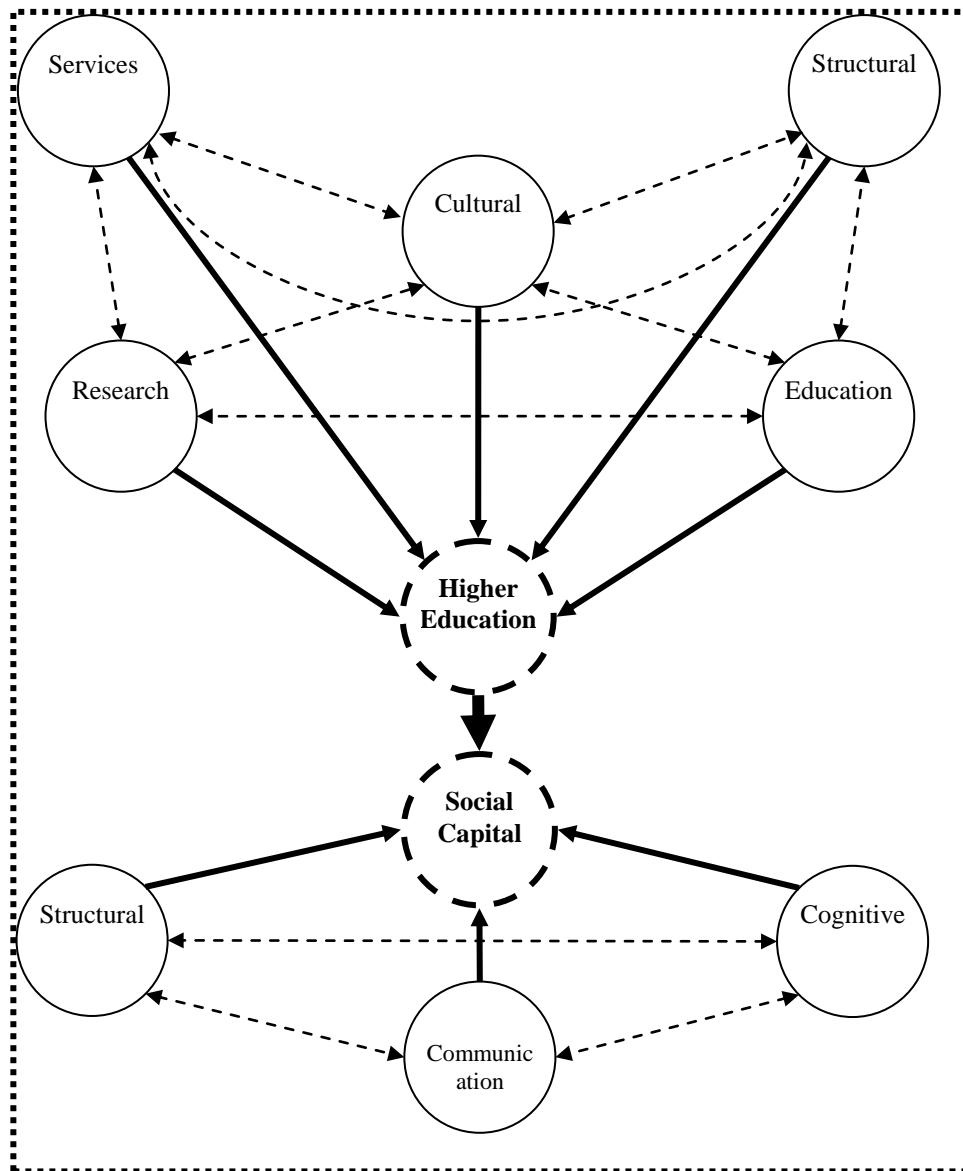


Diagram 2, the levels of connections of the aspects of research variables distinguished by study's variables

**DISCUSSION**

Based on the above mentioned, we can regard the findings of this research parallel to studies done by Krishna (2002), and Woolcock (2001) who regarded social capital as a connective aspect. Ofov (2000) considered social capital in two aspects of structural and cognitive, Krishna and Elizabeth (2005) and Greutrit (2010) regarded cognitive aspect for social capital, and lastly Nahabit and Gushal (1998) considered social capital as three cognitive, connective and structural aspects. Also, regarding the studying and finding the second variable of the research, higher education, besides investigating the literature of this research in Iran and in the world, and its basics, regarding the goal of the study in the stance of social capital growth in higher education, for presenting the right model the extracted components from the literature were 52 for this variable, which we used in the process of the study. Based on our findings, our results are in accordance with studies done by Compretx et al (2006), Man yula (2009), Mcfarlen and Sotu (2008), Geero (2011), Benks (2010), Fernandez (2010) and Fiza and Kristin (2010). Also regarding the aspects of higher education, we may mention the cultural, educational, research, service and structural aspects in this research.



Finally, regarding the effective factors diagnosed in this study, it's proper that managers and experts in educational institutes pay sufficient attention to them. In this area, benefitting from the designed model for promotion and improvement of social capital in educational centers and its effectiveness in other activities is recommended.

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