Structural Capital:
A study of select organizations

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Structural capital is that infrastructure, processes, procedures and databases of the organization that help human capital to function (Maddocks & Beaney, 2002). In order to gain perspective on the concept of structural capital an extensive review of literature was carried out. Objectives of the study were

1. *To study and identify the existing constituents of structural capital.*

2. *To identify new components of structural capital.*

3. *To find out the interrelationship between various constituents of structural capital.*

a) *To study the relationship between organizational capital and structural capital.*

b) *To study the relationship between technological capital and structural capital.*

4. *To develop new comprehensive framework of structural capital in terms of its antecedents and consequents.*

The sample of the study is 269 and is from service sector. The data were collected using the questionnaire formulated after the Review of Literature, the questionnaire had 123 questions. Exploratory Factor Analysis, Confirmatory Factor Analysis and Structural Equation Modelling was used.

In conclusion, Organizational Culture & Climate, Business Reengineering, Intellectual Property Rights, Research and Development, and Internal Control System are predictors of Structural Capital and Impact of systems & programs and Impact of research & development are consequences of structural capital. Also, Management of Information System mediates the relationship between all the predictors except Internal Control System and structural capital

Keywords: *System, Information System and Participation*

INTRODUCTION

Our economy is evolving from being an agrarian economy, to industrial economy to service economy to knowledge economy to a wisdom economy. So, the nature of our economy has made it necessary to understand the concept of structural capital. As new employees, who will replace old employees can always learn from these structures so that the significance of the employees who leave diminishes.

Structural capital is that infrastructure, processes, procedures and databases of the organization that help human capital to function (Maddocks & Beaney, 2002). "The knowledge that stays in the organization when all employees leave at the end of the day. This includes processes, databases and software, (Lundberg, 2012) but also work products from the enterprise architects."

According to the (Edvinsson, 1997), Structural capital can be classified into organization capital, process capital, and innovation capital.

Organization capital includes organization philosophy and systems; while, process capital comprises techniques, procedures, and processes; and innovation capital comprises intellectual property rights and intangible assets. (Essays UK, 2013)

REVIEW OF LITERATURE

In order to gain perspective on the concept of structural capital an extensive review of literature was carried out. It was found that hardly any literature is available on this topic in India which means not much work has been done on this area in India.

Table No. 1 has been formulated stating the definitions given by different researchers.

Table No. 1: "Conceptualization of Structural Capital"	
Authors	Definitions of Structural Capital
Bontis, (1996)	"Those technologies, methodologies, and processes that make the functioning of the organization possible, this is, basically the elements that define the working mode of the firm."
Kogut& Zander, (1996)	"Elements that belong to the organization and that facilitates its configuration as an entity providing coherence and superior principles for coordination."
Euroforum, (1998)	"Knowledge that can be reproduced and shared, therefore, becomes somewhat explicit."
Camison, Palacios, & Devece, (2000)	"Knowledge that the organization has internalized and that remains within its structure processes or culture although employees leave."
Carson, Ranzijn, Winefield, & Marsden, (2004)	"Processes and procedures that arise from employee intellectual contribution."
Ordonez de Pablos, (2004)	"Knowledge that remains in the organization when employees return to their homes and, therefore, is owned by the firm. In this sense, SC is integrated by organizational routines, strategies, process manuals, and datoabases."
Alama, (2007)	"Intangibles that determine the manner of working of a company."

(Essays UK, 2013)

Dr. Nick Bontis, Director, Institute for Intellectual Capital Research Inc. designed a questionnaire to develop and test a measure for Intellectual Capital. The questions relating to structural capital were as follows:

➢ "When an employee leaves the firm, we do not have a succession training program for his/ her replacement.

➢ Our company develops more new ideas and products than any other firm in the industry.

➢ When someone comes up with a great idea, we do not share the knowledge within the firm as much as we should.

➢ Our recruitment program is comprehensive; we are dedicated to hiring the best candidates available.

➢ Our data system makes it easy to access relevant information.

➢ If certain individuals in the firm unexpectedly leave then, we would be in big trouble.

➢ The systems and procedures of the organization support innovation.

➢ Individuals learn from others.

➢ Employees are excited to voice their opinions in group discussions.

➢ Our organizational structure keeps employees from being too far removed from each other.

➢ The organization's culture and atmosphere is supportive and comfortable."

(Bontis, 1998)

Two studies which were conducted on this particular topic have been discussed in detail in Table No. 2

Table No. 2: Details of the studies related to the topic					
Authors	Topic of study	Country of study	Sample size	Survey instrument	Test Applied
Aziz, Sharabati, Jawad & Bontis, (2010)	Intellectual capital and business performance in the pharmaceutical sector	Jordan	132 top and middle level managers drawn from Jordanian Association of Pharmaceutical Manufacturers (JAPM)	Based on Bontis' intellectual capital questionnaire	1.Kolmogorov Smirnov 2.Cronbach alpha 3.Pearson's principal component analysis 4.Pearson's bivariate correlation coefficient 5.ANOVA test 6.Partial Least Squares 7.Path analysis
Sofian, Tayles, & Richard, 2005	"The implications of intellectual capital on performance measurement and corporate performance"	Malaysia	With a 35% response rate, 119 responses were received. The companies "were randomly selected from the Kuala Lumpur Stock Exchange (KLSE) list. The high Intellectual Capital companies were drawn from four broad sectors, where IC is expected to be beneficial, technology, consumer products, trading and services, and finance sectors."	25 questions "were used to construct variables for human (HIC), structural (SIC), and relational (RIC) capital"	1.Tests for reliability 2.Analysis of descriptive statistics 3.Spearman-Rho's Rank Correlation

SCOPE OF RESEARCH WORK

This study is restricted to the service sector organizations in India. In service sector following sectors have been selected for the study:

- Banking
- Hotels
- Reality
- Information Technology
- Communication

The organizations have been selected on the basis of Net Sales for March 2012 according to Prowess database. The top three private and public sector banking organizations, top three hotels, top three telecommunication companies, top three real estate companies, and top three IT companies given in Prowess on the basis of net sales were randomly selected.

FORMULATION OF THE PROBLEM AND METHODOLOGY

While going through the concept of intellectual capital it was found that broadly it can be categorized into three:

1. Human Capital
2. Structural Capital
3. Relational Capital

It was observed that a lot of work has been done on the topic of Human Capital but structural capital, has not been well studied and researched in India. Many authors have defined the term in different ways. Also, the constituents of structural capital have been brought forward by diverse researchers.

So, the research gaps have been identified and it was decided to find out the status of the concept of structural capital in the Indian service sector industry.

This study concentrates on:

1. Identify the meaning of structural capital.

2. Identify the constituents of structural capital.

Thus the research questions are:

Research Question 1: What do you mean by the term structural capital?

Research Question 2: What are the constituents of structural capital?

Methodology

Objectives of Study

1. To study and identify the existing constituents of structural capital.

2. To identify new components of structural capital.

3. To find out the interrelationship between various constituents of structural capital.

   a) To study the relationship between organizational capital and structural capital.

   b) To study the relationship between technological capital and structural capital.

4. To develop new comprehensive framework of structural capital in terms of its antecedents and consequents.

Population

The population for this study constitutes all the employees of all levels of service sector organizations except the lower level of the selected organizations.

Sample

The sample of this study is the employees of all levels except the lower level of service sector organizations like Industrial Credit and Investment Corporation of India Bank Ltd., Housing Development Finance Corporation Bank Ltd., Axis Bank Ltd. , State Bank of India, Punjab National Bank, Canara Bank, Indian Hotels Co. Ltd., EIH Ltd., etc.

Data Analysis: Data collected from structured questionnaire has been analyzed with the help of various statistical softwares like Statistical Package for Social Sciences (SPSS 20) (for univariate and multivariate analysis), AMOS 20 (for structured equation modelling), etc.

Reliability for the constituents of structural capital is gauged by cronbach's alpha and spearman's-brown equal length, and split half coefficient. Confirmatory factor analysis has been used to ensure construct validity of the various constituents of structural capital.

Survey

QUESTIONNAIRE DESIGNING

The first most important thing to do the survey is designing a questionnaire; hence, the following procedure was followed for designing the questionnaire.

After an in-depth literature review a questionnaire containing 123 questions was formulated. The questionnaire had the following factors (containing various questions) taken from various studies:

AMITY
BUSINESS SCHOOL

Table No. 3 : Table showing variables and factors taken from various researches		
S.No.	**Factor**	**Research**
1.	System	(Topal, Conkar, & U C), (Bontis, 1998), (Aziz, Sharabati, Jawad, & Bontis, 2010), (Sofian, Tayles, & Richard, 2005), (Youndt & Snell, 2004)
2.	Research and Development	(Aziz, Sharabati, Jawad, & Bontis, 2010)
3.	Intellectual Property Rights	(Amiri, Jandghi, Alvani, Hosnavi, & Majid, 2010), (Sofian, Tayles, & Richard, 2005), (Youndt & Snell, 2004)
4.	Information System	(Topal, Conkar, & U C), (Bontis,1998), (Youndt & Snell, 2004), (Aziz, Sharabati, Jawad, & Bontis, 2010), (Sofian, Tayles, & Richard, 2005)
5.	Culture	(Topal, Conkar, & U C), (Bontis, 1998), (Amiri, Jandghi, Alvani, Hosnavi, & Majid, 2010), (Youndt & Snell, 2004)
6.	Learning Organization	(Topal, Conkar, & U C), (Bontis, 1998), (Amiri, Jandghi, Alvani, Hosnavi, & Majid, 2010), (Sofian, Tayles, & Richard, 2005)
7.	New Ideas	(Bontis, 1998), (Sofian, Tayles, & Richard, 2005), (Amiri, Jandghi, Alvani, Hosnavi, & Majid, 2010), (www.hfi.com, 2011)
8.	Documentation	(Youndt & Snell, 2004)
9.	Strategy	(Amiri, Jandghi, Alvani, Hosnavi, & Majid, 2010)
10.	Communication	(www.hfi.com, 2011)
11.	Authority and Responsibility	(www.hfi.com, 2011)
12.	Participation	(www.hfi.com, 2011)

Data collection details

Table No. 4 showing details of data collection from all service sector organizations		
S.NO.	**SECTOR**	**NO. OF RESPONSES**
1.	BANKING	156
2.	REAL ESTATE	47
3.	INFORMATION TECHNOLOGY	44
4.	OTHER SERVICE SECTOR (HOTELS AND COMMUNICATION)	22
	TOTAL	269

Results

Reliability Analysis

Reliability Analysis: Cronbach's alpha was computed using SPSS 20 for all the factors and the entire questionnaire in order to test the internal consistency of the questions.

Table No. 5 Cronbach's alpha		
S. No.	**Name of construct**	**Value of Cronbach's alpha**
1.	System	0.802
2.	Research & Development	0.914
3.	Intellectual Property Rights	0.964
4.	Information System	0.886
5.	Culture	0.760
6.	Learning Organization	0.808
7.	New Ideas	0.932
8.	Documentation	0.834
9.	Strategy	0.535
10.	Communication	0.876
11.	Authority & Responsibility	0.900
12.	Participation	0.915

The value of Cronbach's alpha for all the above factors is more than 0.75 except in case of strategy; hence there is internal consistency in all the factors except in the factor strategy. The reliability of the entire questionnaire is 0.978.

6 Exploratory Factor Analysis

(Tabachnick & Fidell, 2007)"suggests that one should have at least 300 cases for factor analysis. (Hair, Anderson, Tatham, & Black, 1995) proposed that sample sizes can be 100 or greater. However, different school of authors, have different opinions (MacCullum, Widaman, Zhang, & Hong, 1999) believe that when the communalities are higher (greater than 0.6), and several variables explain each factor, then relatively small sample size can also be sufficient."

Varimax rotation was run, restricting the number of factors to 8 and cut off of 0.05 was taken, the result was that 63.717% variance was explained.

Table No. 5(given in Annexure 1) shows that 8 factors explain 63.717% variance. The rotated component matrix is given in Table No. 6 (given in Annexure 2)

Naming the factors and Reliability of antecedents

After a detailed study of all the variables, the factors have been named and their reliability checked.

CONFIRMATORY FACTOR ANALYSIS

"In order to check how well the measured variables represent a construct CFA was applied. CFA was run on eight factors which were having three or more than 3 variables namely: OCC, IPR, ICS, RnD, BR, Imr, MIS, and Imos."

As can be seen in Figure 1, all the eight constructs are shown, each construct is having 3 or having more than 3 variables. The one sided arrow shows the relationship between construct and its variable and the two sided arrow shows the co-relation between the constructs. After applying the CFA, the validity was checked the results of which can be seen in Table No. 8

Validation of Factor Analysis

The next step is to assess the validity of the EFA so conducted. By employing confirmatory factor analysis (CFA), the researchers can cross validate the factor structure in an appropriate way (Byrne, 1998); (Joreskog & Sorbom, 1989); (Pedhazur & Schmelkin, 1991).

Table No. 8 Cronbach's Alpha Score of Antecedents		
Antecedents	Items scale summated	Cronbach's Alpha
Organization Culture & Climate (OCC)	28	0.964
Intellectual Property Rights (IPR)	15	0.964
Internal Control System (ICS)	11	0.911
Research and Development (RnD)	5	0.897
Business Reengineering (BE)	3	0.734
Impact of RnD (Imr)	4	0.784
Management of Information System (MIS)	4	0.768
Impact of system (Imos)	3	**0.931**
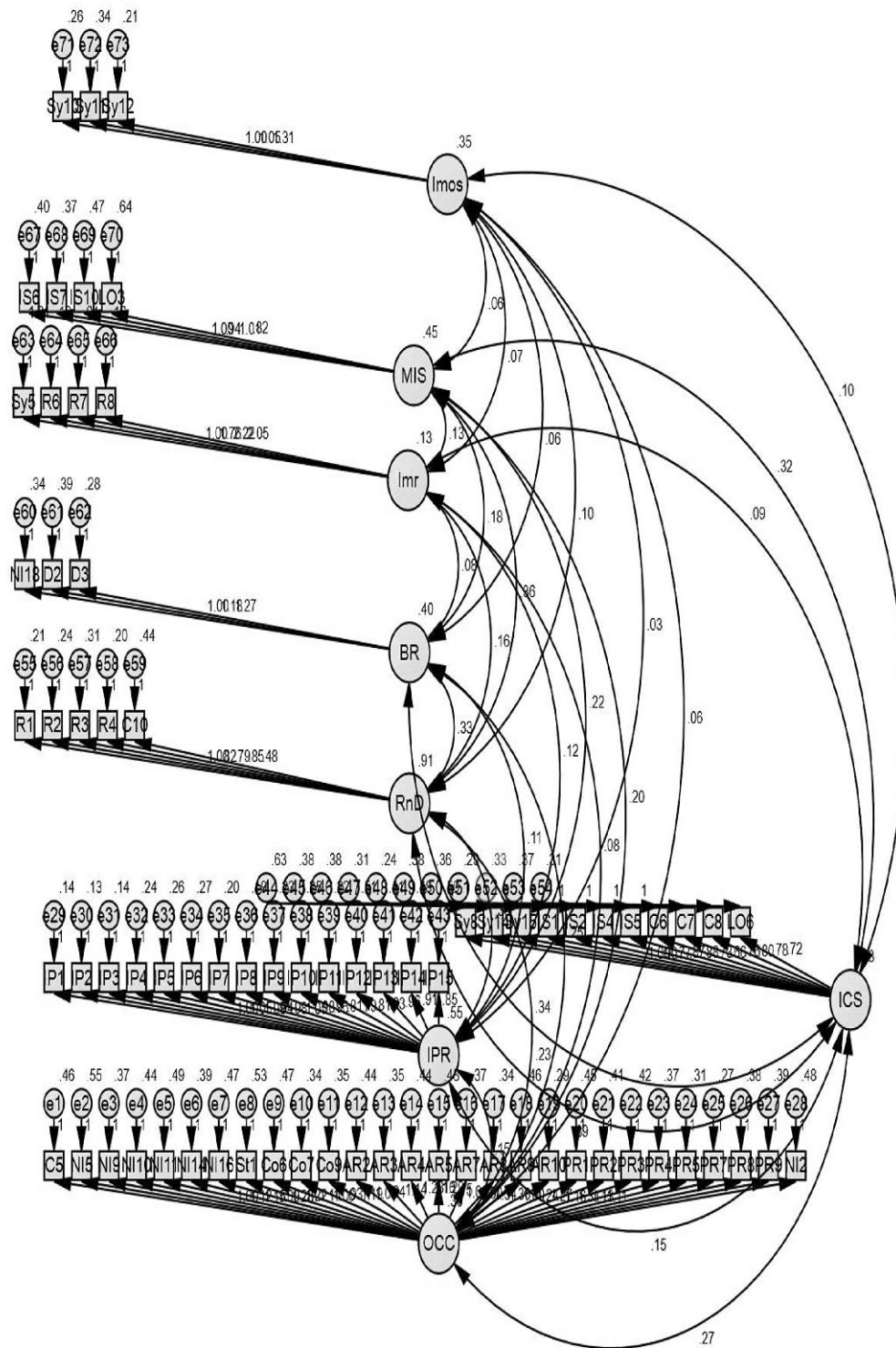
Figure 1 Confirmatory Factor Analysis of SC Antecedents

Table No. 9 Validity scores for antecedents											
	CR	AVE	MSV	ASV	Imr	OCC	IPR	ICS	RnD	BR	MIS	Imos
Imr	0.853	0.620	0.307	0.182	0.787							
OCC	0.964	**0.491**	**0.521**	0.293	0.420	**0.701**						
IPR	0.964	0.646	0.198	0.119	0.445	0.365	0.804					
ICS	0.914	**0.491**	0.458	0.244	0.361	0.677	0.274	0.701				
RnD	0.902	0.652	0.428	0.254	0.469	0.654	0.423	0.564	0.808			
BE	0.826	0.613	0.521	0.206	0.351	0.722	0.235	0.494	0.543	0.783		
MIS	0.777	**0.467**	0.425	0.246	0.554	0.542	0.434	0.652	0.555	0.423	0.683	
Imos	0.823	0.609	0.122	0.043	0.349	0.193	0.077	0.240	0.179	0.158	0.156	0.780

VALIDITY CONCERNS

Discriminant Validity: the square root of the AVE for AR is less than one the absolute value of the correlations with another factor.

Convergent Validity: the AVE for OCC is less than 0.50.

Discriminant Validity: the AVE for OCC is less than the MSV.

Convergent Validity: the AVE for ICS is less than 0.50.

Convergent Validity: the AVE for MIS is less than 0.50.

In order to resolve the validity issues all the variables with less than 0.7 standardized regression weights were removed. The variables C5, NI5, NI10, NI16, St1, Com 6, Com 9, AR 2, AR9, PR3, NI2, IP12, IP14, IP15, Sy 8, Sys 15, IS4, IS5, C8, LO6, C10, Sy 5, and LO3, all had standardized regression weight less than 0.7 and hence, were removed from further analysis. Therefore, once all the variables with less than 0.7 standardized regression weight were removed, CFA was again run and the validity was once again checked in the Smart Tool Package (Gaskin, 2012), the results are shown in Table No. 9.

Table No. 10 Validity Assessment (Revised)											
	CR	AVE	MSV	ASV	IPR	OCC	IS	RnD	BR	Imr	MI	Imos
IPR	0.964	0.690	0.185	0.104	0.830							
OCC	0.953	0.542	0.504	0.253	0.359	0.736						
IS	0.857	0.551	0.347	0.177	0.198	0.558	0.743					
RnD	0.918	0.738	0.402	0.221	0.409	0.634	0.447	0.859				
BR	0.826	0.613	0.504	0.183	0.223	0.710	0.415	0.530	0.783			
Imr	0.920	0.794	0.283	0.169	0.430	0.420	0.299	0.458	0.350	0.891		
MI	0.771	0.529	0.347	0.201	0.390	0.455	0.589	0.510	0.359	0.532	0.727	
Imos	0.823	0.609	0.120	0.046	0.063	0.202	0.278	0.168	0.156	0.346	0.162	0.780
No Validity Concerns - Wahoo!												

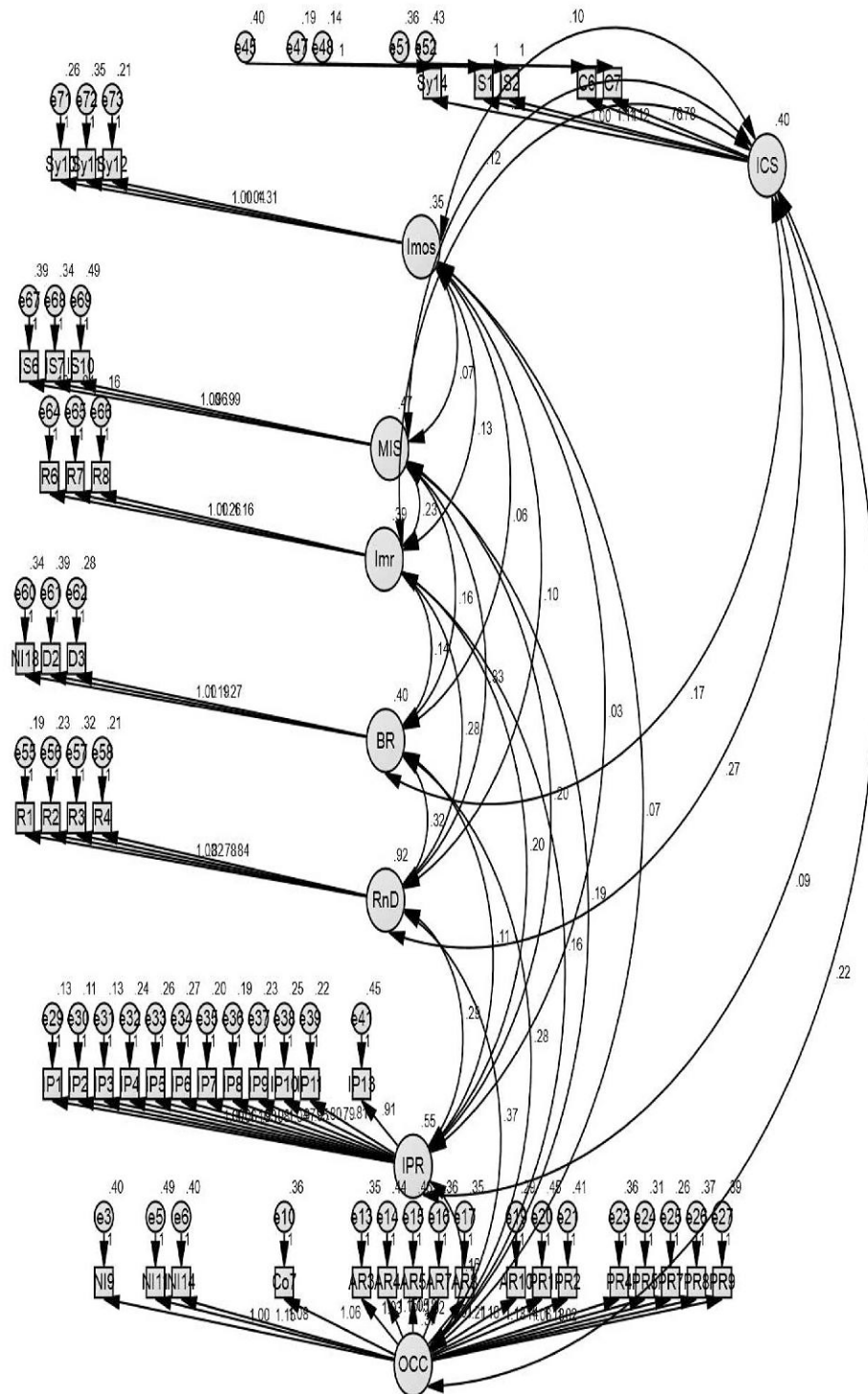As there is no validity concern, we can go ahead and apply CFA.

Figure 2 CFA Measurement Model of the Drivers Identified

After the removal of the above stated variables, the CFA was run again and the result can be seen in Figure 2.

Model Fit Summary

"The overall model χ2 is" 2294.795 with 1063 DOF. "The p-value is not significant though as our sample is large enough we can never get a significant value. In order to overcome this problem, it has been recommended, that a model exhibits a reasonable fit if the χ2/DOF (i.e., chi-square divided by degrees of freedom) does not exceed 3.0"(Kline, 2004). In this case the χ2 / DOF = 2.159 which exhibits that the model has a good fit as it is within the recommended range of less than or equal to 3.0.

"Further, the rule of thumb as suggested by (Hair, Black, Babin, & Anderson, 2010) elaborates elaborates that the researcher should focus on at least one absolute fit index and one incremental fit index, in addition to the χ2 results."

The RMSEA (root mean square error of approximation), which is an absolute fit index comes out to be 0.066. "According to (Browne & Cuddeck, 1992), RMSEA values ≤ 0.05 can be considered as a good fit, values between 0.05 and 0.08 as an adequate fit, and values between 0.08 and 0.10 as a mediocre fit, whereas values > 0.10 are not acceptable" (Engel, Moosbrugger, & Muller, 2003). Therefore, the value of RMSEA shows that our model is an adequate fit. The value of RMR (Root square residual) is 0.047, "well-fitting models obtaining values less than 0.05 (Byrne, 1998), (Diamantopoulos & Siguaw, 2000), however values as high as 0.08 are deemed acceptable"(Hu & Bentler, 1999). Thus, our model is well fit.

Moving towards the incremental fit indices, the researcher assessed CFI value. CFI is the most widely used index. In the present CFA model of SC predictors, the CFI has a value of 0.894. Although, "a cut-off criterion of CFI ≥ 0.90 was initially advanced however, recent studies have shown that a value greater than 0.90 is needed in order to ensure that misspecified models are not accepted. From this, a value of CFI ≥ 0.95 is presently recognized as indicative of good fit"(Hu & Bentler, 1999). In our model the CFI value does not pass this criterion by a mere 0.006 points.

Under parsimony adjusted measures, PNFI value is 0.713, (Mulaik, James, Van Alstine, Bennet, Lind, & Stilwell, 1989)"do note that it is possible to obtain parsimony fit indices within the 0.50 region while other goodness of fit indices achieve values over 0.90"(Mulaik, James, Van Alstine, Bennet, Lind, & Stilwell, 1989). Thus, our model is well fit.

Structural Equation Model (SEM)

After the completion of CFA we go ahead with SEM, from the questionnaire and the CFA we infer that Impact of research and development and Impact of system can be the two consequences and Organization Culture & Climate, Intellectual Property Rights, Internal Control System, Research and Development, Business Reengineering and Management Information System can be the antecedents of Structural Capital.

So, we get the Structural Equation Model as given in Figure No. 3.
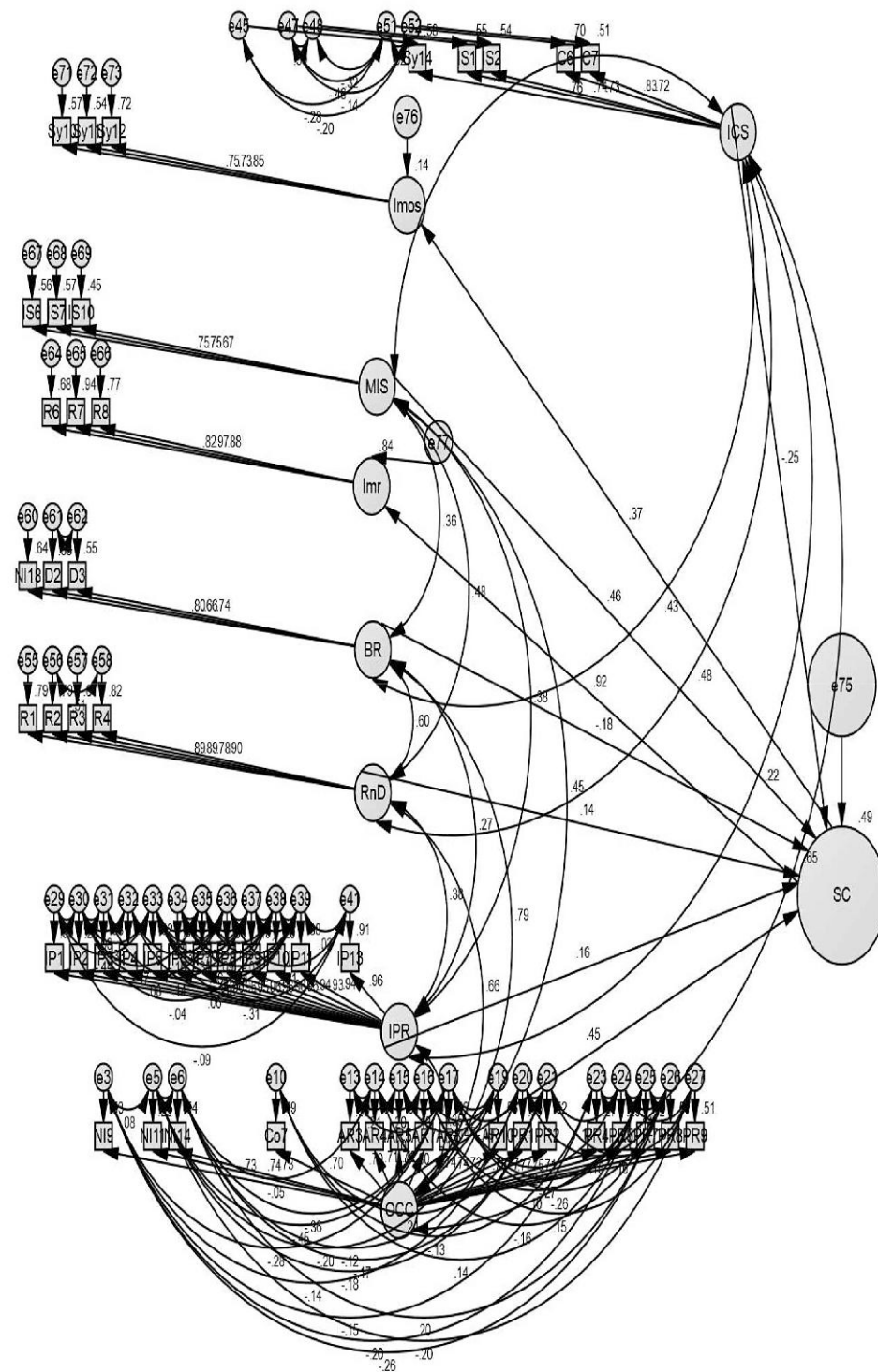
Figure No. 3 Structural Equation Model for Structural Capital

In order to interpret the given model, lets move step by step.

I Step: Assessing the correlations between antecedents

Table No. 11 Correlation between Antecedents			
Particulars			**Correlation**
OCC	<__>	IPR	0.359
OCC	<-->	ICS	0.646
OCC	<-->	RnD	0.657
OCC	<-->	BR	0.794
OCC	<-->	MIS	0.445
IPR	<-->	ICS	0.242
IPR	<-->	RnD	0.383
IPR	<-->	BR	0.27
IPR	<-->	MIS	0.395
ICS	<-->	RnD	0.481
ICS	<-->	BR	0.43
ICS	<-->	MIS	0.614
RnD	<-->	BR	0.6
RnD	<-->	MIS	0.483
BR	<-->	MIS	0.36

We can infer from table 11that all antecedents have correlations amongst each other but none has a correlation as high as 0.8, which means there is no multicollinearity issue and all antecedents are not measuring the same thing.

Step II Checking the results of the SC Model

As can be inferred from Table No. 12 that there is only one predictor, Management Information System, also, Impact of Research and Development and Impact of system are indeed consequences of Structural capital.

Table No. 12 Result of SC Model							
Relationship Depicted			Estimate	S.E.	C.R	P	SRW
SC	<---	OCC	1				0.458
SC	<---	IPR	0.262	0.132	1.985	0.047	0.141
SC	<---	RnD	0.219	0.132	1.66	0.097	0.149
SC	<---	BR	-0.374	0.181	-2.067	0.039	-0.186
SC	<---	ICS	-0.527	0.186	-2.828	0.005	-0.259
SC	<---	MIS	0.933	0.25	3.73	***	0.469
Imos	<---	SC	0.157	0.032	4.889	***	0.368
Imr	<---	SC	0.42	0.076	5.506	***	0.921

Mediation

Based on the Table No. 13, we take MIS as mediator and find out the direct effect on SC without mediator first and then the direct effect on SC with mediator.
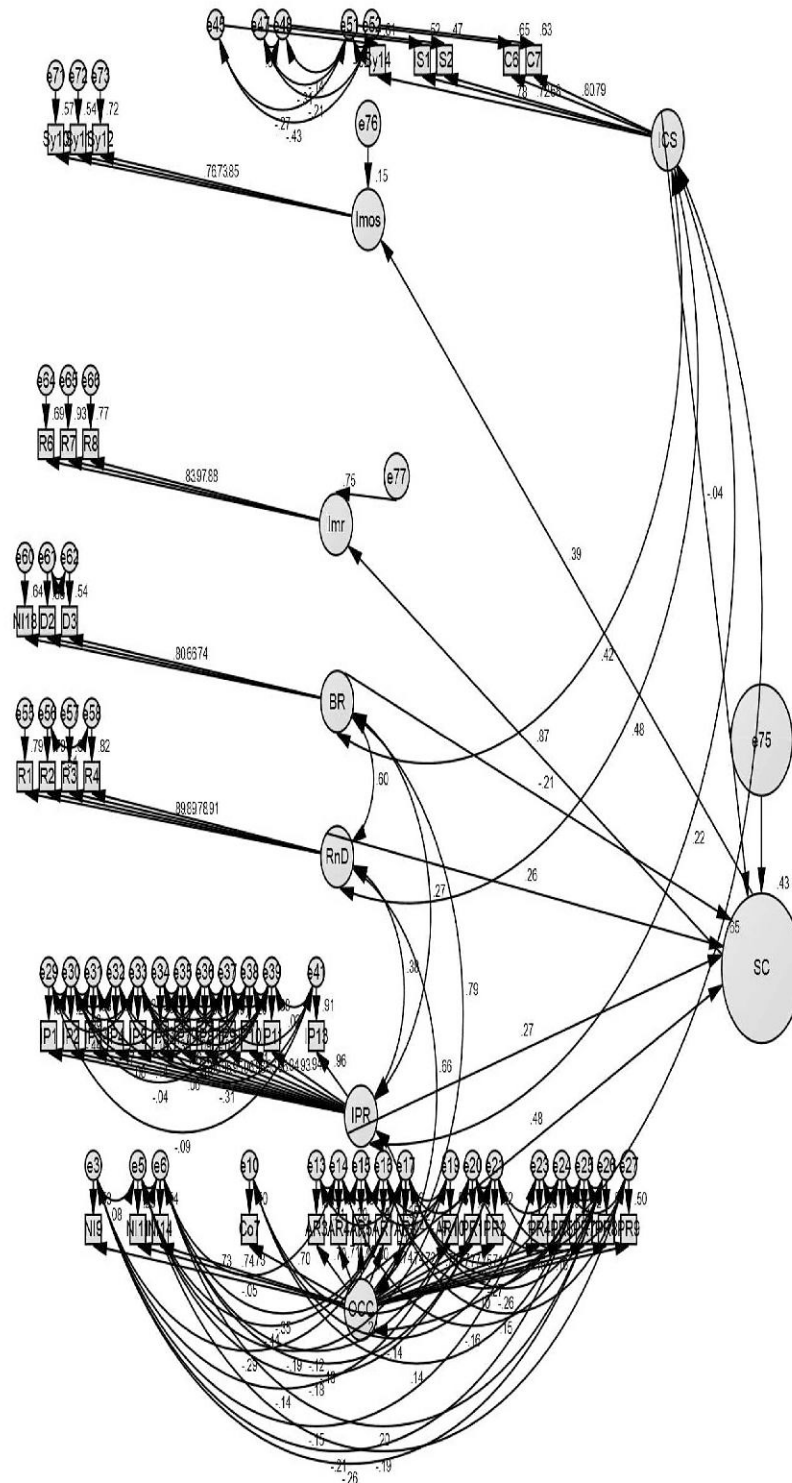
Figure No. 4 Direct Effect without MIS
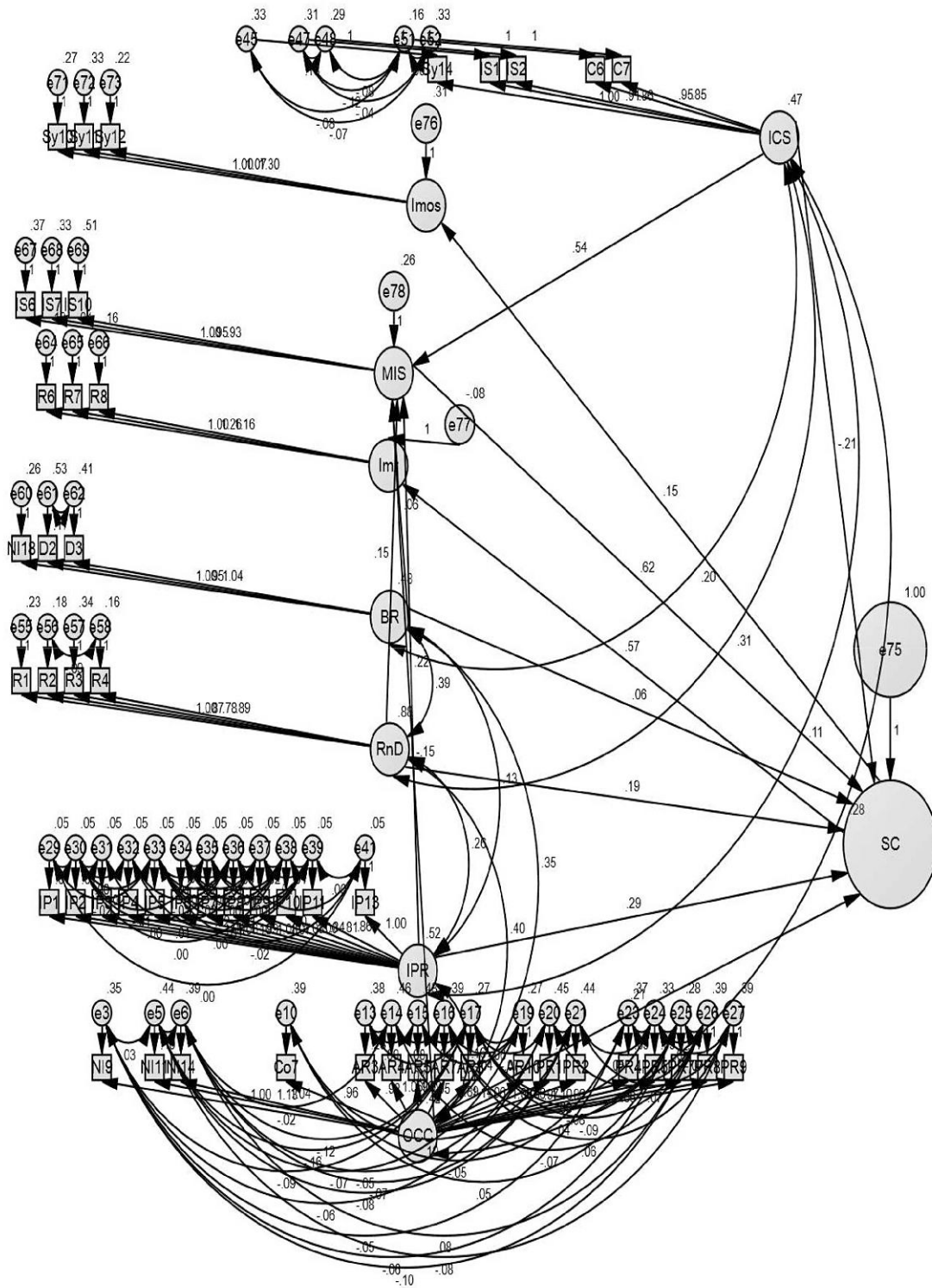
Figure No. 5 Mediating effect of MIS

(Baron & Kenny, 1986) Approach: According to this approach, the direct effect is first measured without mediator MIS on the dependent variable SC. The results are given in Table No. 11. Then mediator variable MIS is added and results are again mentioned in Table No. 11 in the respective column. There can be three results based on (Baron & Kenny, 1986) approach, viz., no mediation, partial mediation, and full mediation.

1. "If there is drop in strength in the second case, and still significant then it indicates partial mediation." This can be seen in case of IPR.

2. "Not significant in first case and still not significant in the second case indicating no mediation." This can be seen in the case of ICS.

3. "Drop in strength when compared to the first case, significant in first case and insignificant in second case depicting full mediation." This can be found in the case of OCC and RnD.

Bootstrapping

It is a method of testing the indirect effect of mediation. It is a non parametric method. It can be explained as follows:

"No mediation

- If indirect effect is insignificant.

- Also if direct effect of independent variable on mediator is insignificant.

Indirect Effect

- Both direct effects are not significant, but indirect effect is significant. This can be seen in the case of ICS.

Full mediation

- Given the direct effects were significant prior to adding the mediator.

- If indirect is significant and direct with mediator is not significant."

This can be seen in the case of OCC, BR and RnD.

Partial mediation

- If direct with mediator and indirect are significant. This can be seen in the case of IPR.

Table No. 13 Testing mediation				
Relationship	Direct without mediator	Direct with mediator	Indirect Effect	Decision based on the above stated approach
OCC-MIS-SC	1(S)	0.211(NS)	Significant	Full mediation
ICS-MIS-SC	-0.082(NS)	-0.215(NS)	Significant	No mediation
BR-MIS-SC	-0.407(S)	0.059(NS)	Significant	Full mediation
RnD-MIS-SC	0.362(S)	0.185(NS)	Significant	Full mediation
IPR-MIS-SC	0.492(S)	0.293(S)	Significant	Partial mediation

On the basis of the analysis the SC model developed is given in Figure No. 6.
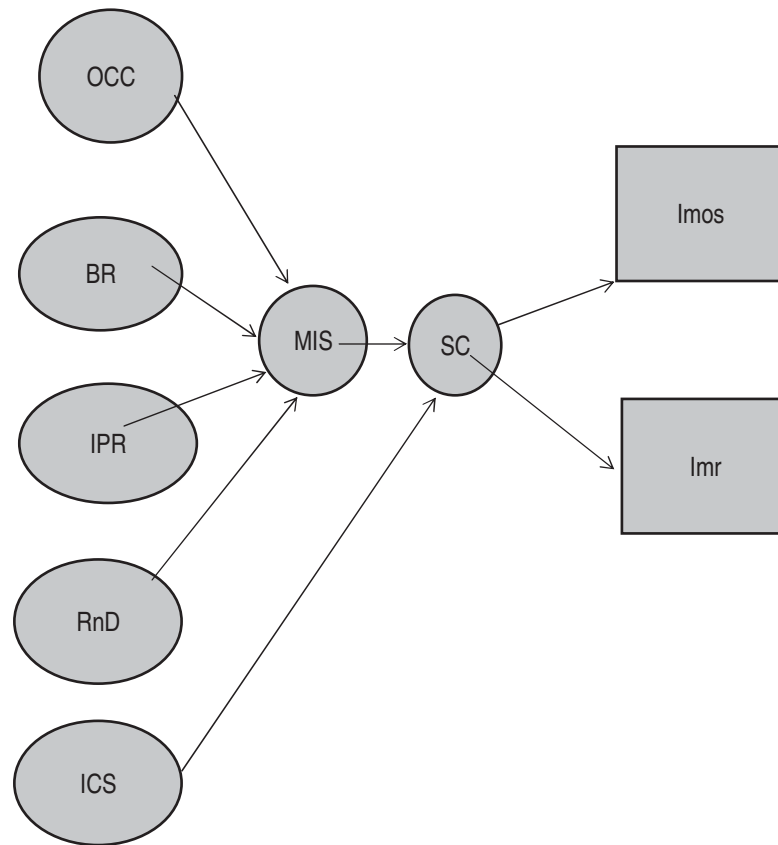
Figure No. 6 SC Model Simplified

Hence, we can conclude that Organizational Culture & Climate, Business Reengineering, Intellectual Property Rights, Research and Development, and Internal Control System are predictors of Structural Capital and Impact of systems & programs and Impact of research & development are consequences of structural capital. Also, Management of Information System mediates the relationship between all the predictors except Internal Control System and structural capital as can be inferred from Table 13.

RECOMMENDATIONS

As we see in order to have a good structural capital in service sector, organizations should have good organization culture and climate, intellectual property rights, research and development, management information system and business reengineering. It is important that organizations that wish to build a good structural capital should emphasize on all the above stated factors.

Recommendations for improving Organization Culture and Climate

According to the Organization Culture questionnaire from (Human Factor International, 2011), organization culture can have thirteen dimensions, out of the thirteen dimensions only four dimensions were found to be related to structural capital and were included in the present study.

The dimensions were innovation, communication, organization structure and participation. After the application of SEM all these four dimensions were clubbed into one factor and named as Organization culture and climate.

It was found that organization culture is a predictor of structural capital, thus, to enhance the structural capital of an organization following steps can be emphasized:

1. Promoting innovation: Employees should be encouraged to be innovative, rewards and appreciation can bring innovation in the organization as was stated in the eighth question relating to the factor participation of the questionnaire.

2. Top management should spend time on the new ideas submitted by employees and time should be made available to employees to come up with new ideas as was stated in eleventh question relating to the factor new ideas and fifth question relating to the factor participation of the questionnaire.

3. A smooth and extensive orientation and socialization program should be held while inducting employees in which the job responsibilities, job functions, authorities and duties should be clearly defined as was stated in the fifth and sixth question relating to the factor authority and responsibility of the questionnaire.

4. Employees should feel that they are important for the organization and their contribution in the organization is being well appreciated as was stated in the seventh question relating to the factor authority and first and fourth question relating to the factor participation of the questionnaire.

Recommendations for improving Intellectual Property Rights

Intellectual property rights are important for any organization as these are the assets which are though intangible but bring in a lot of business. The Intellectual property rights of organization can be improved by: '

1. Investing sufficiently in trademarks as stated in the thirteenth question relating to the factor

intellectual property rights of the questionnaire. Trademarks of a company are nothing but the logo, symbols. All the organizations that formed part of this study like SBI, HDFC, DLF, Omaxe, TCS, Wipro have logos. The logo gives recognition to the organization and hence needs to be very carefully selected.

2. A clear cut strategy should be formulated in order to ensure creation and management of intellectual property rights as stated in the first question relating to the factor intellectual property rights of the questionnaire.

3. Clear cut procedures should be set for intellectual property rights management as stated in the second question of the factor intellectual property rights of the questionnaire.

4. The performance of the intellectual property rights portfolio should be monitored as stated in the third question of the factor intellectual property rights of the questionnaire.

5. Finance should be made available for intellectual property rights as without money none of the other steps can be achieved.

6. Support from top management be made available for intellectual property rights as without the top management support nothing is possible.

Recommendations for improving Research and Development

1. Appropriate budget should be determined for research and development as stated in the fourth question relating to the factor research and development of the questionnaire.

2. Top management support be made available for research and development as nothing is possible without top management support.

3. The company should continuously develop and reorganize itself based on R &D as stated in the second question of research and development factor of the questionnaire.

Recommendations for improving Business Reengineering

1. Systems, programs and procedures should be analyzed and regular efforts should be made in order to remove the steps which are of no use and lead to waste of time. This can be done by encouraging employees to continuously update the knowledge databases of the organization as has been stated in the third statement of the factor documentation in the questionnaire.

2. Employees who work on the systems should be asked to give suggestions and they should be involved in redesigning the systems as stated in the second question of the factor documentation of the questionnaire.

3. Change is the only constant and hence organizations should keep on learning, unlearning and relearning. Employees should be given opportunity to enhance their skills and help the organization develop. This can be inferred form the eighteenth question of the factor new ideas in the questionnaire.

Recommendations for improving Management Information System

All the managerial functions like planning, organizing, staffing directing and controlling require information of all sorts and so it is important that the right information is available to the right person at the right time, ensuring that significant information is maintained and can be retrieved as and when required is what management information system is all about. Management Information system can be improved in the following manner:

1. Information of all sorts like human resource, finance, and marketing should be maintained and backups should also be created, they should be available to employees as stated in the sixth question of the factor information system of the questionnaire.

2. Information systems should be integrated with each other as can be inferred from the seventh question of the factor information system of the questionnaire.

3. Information system should be leading edge as found in the tenth statement of the factor information system in the questionnaire.

Recommendations for improving Internal Control System

It is significant to have an internal control system in an organization to ensure that the organization is performing in accordance with the plans, and there are no major deviations. A good internal control system ensures a good structural capital in an organization. In order to ensure a good internal control system following points should be kept in mind:

1. All the employees should be well aware of the business philosophy as stated in the fifth question of the factor culture of the questionnaire. In case the employees only concentrate on their own job and do not see how their job adds value to the organization and contributes to achieving the organization vision and mission, there can be major losses incurred by the organization. Therefore, a well-coordinated system is what is essential for a good internal control system. No department and no employee should work in vacuum rather they should understand the broader picture.

2. The first and foremost step for controlling is measurement. If you cannot measure anything, you cannot control it. Thus, it is significant to measure the performance in all the fields, i.e., marketing, human resource management and finance etc. And measurement alone is of no use if records are not maintained of whatever is being measured. So, having an information system can be of great help and hence organizations should invest sufficiently in information system as stated in the second question of the factor information system of the questionnaire.

3. This information system should be very strong, as wrong information can be disastrous, a strong information system will help ensure that the internal control system is worthwhile. This has been inferred from the first question of the factor information of the questionnaire. Innumerable softwares are available for all the fields. For Human Resource, softwares like sage HRMS, Halogen, Kronos, Time Click, mindScope, TimeIPS, optimum HRIS, Synerion, mitrefinch, PeopleTrak, PDS, elogic Learning, Workday, greytip, peoplesoft, and ISGUS are available. For accounting softwares like Oracle, SAP, AccountMate, CYMA, Intacct, Red Wing TRAVERSE are available. In marketing there are softwares like Marketics, Market Smart 360, Lyris HQ, LIFT, Leadsius, and Lead Follow-Up. For finance softwares like pcFinancials, BusinessPLUS, FinPro, FMS II and PlumFAS are available. These softwares can be used.

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35 Scholars have been awarded Ph. D. degree, and 8 are pursuing Ph. D. under his supervision.

Dr. Singh served as Vice Chancellor of University of Jazeera, Dubai, UAE and has travelled to 23 countries and addressed in more than 200 conferences/seminars/workshops/training programs.

Dr. Singh is Fellow and Managing Trustee of Indian Commerce Association (ICA), Immediate Past President of Indian Commerce Association Delhi NCR Chapter, Immediate Past President of Indian Association for Management Development (IAMD), Hony. President of Governing Body of Divine Group of Institutions, DSPSR, and many NGOs.

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Annexure 1

Table No. 5 Total Variance Explained								
Component	**Initial Eigenvalues**			**Extraction Sums of Squared Loadings**			**Rotation Sums of Squared Loadings**		
	Total	**% of Variance**	**Cumulative %**	**Total**	**% of Variance**	**Cumulative %**	**Total**	**% of Variance**	**Cumulative %**
1	28.574	34.426	34.426	28.574	34.426	34.426	15.352	18.497	18.497
2	8.442	10.172	44.598	8.442	10.172	44.598	11.192	13.484	31.981
3	4.125	4.970	49.568	4.125	4.970	49.568	8.416	10.139	42.120
4	3.003	3.618	53.186	3.003	3.618	53.186	5.522	6.653	48.773
5	2.841	3.423	56.610	2.841	3.423	56.610	3.502	4.219	52.992
6	2.129	2.565	59.174	2.129	2.565	59.174	3.006	3.621	56.613
7	1.995	2.404	61.578	1.995	2.404	61.578	2.977	3.587	60.200
8	1.775	2.139	63.717	1.775	2.139	63.717	2.919	3.517	63.717
9	1.630	1.964	65.682						
10	1.400	1.687	67.369						
11	1.315	1.584	68.953						
12	1.182	1.424	70.377						
13	1.149	1.384	71.761						
14	1.073	1.292	73.053						
15	0.976	1.176	74.229						
16	0.945	1.139	75.367						
17	0.878	1.058	76.425						
18	0.810	0.976	77.401						
19	0.783	0.944	78.345						
20	0.770	0.927	79.273						
21	0.713	0.859	80.132						
22	0.697	0.839	80.971						
23	0.669	0.806	81.777						
24	0.635	0.765	82.542						
25	0.606	0.731	83.273						
26	0.592	0.713	83.986						
27	0.568	0.684	84.670						
28	0.548	0.661	85.331						
29	0.541	0.652	85.983						
30	0.509	0.613	86.596						
31	0.477	0.575	87.171						
32	0.470	0.566	87.737						

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Component	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
33	0.455	0.548	88.285						
34	0.441	0.531	88.816						
35	0.421	0.507	89.323						
36	0.409	0.493	89.816						
37	0.394	0.475	90.291						
38	0.392	0.472	90.763						
39	0.362	0.436	91.199						
40	0.355	0.427	91.627						
41	0.339	0.408	92.035						
42	0.327	0.394	92.429						
43	0.323	0.389	92.818						
44	0.303	0.365	93.183						
45	0.294	0.354	93.537						
46	0.279	0.336	93.873						
47	0.277	0.333	94.206						
48	0.264	0.319	94.525						
49	0.251	0.302	94.827						
50	0.239	0.288	95.116						
51	0.239	0.288	95.403						
52	0.220	0.265	95.668						
53	0.219	0.263	95.931						
54	0.210	0.253	96.184						
55	0.204	0.246	96.430						
56	0.188	0.226	96.655						
57	0.182	0.219	96.874						
58	0.181	0.218	97.092						
59	0.168	0.202	97.294						
60	0.161	0.194	97.487						
61	0.155	0.187	97.674						
62	0.149	0.179	97.853						
63	0.140	0.168	98.022						
64	0.137	0.165	98.187						
65	0.129	0.155	98.342						
66	0.124	0.149	98.491						

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
67	0.111	0.134	98.625						
68	0.110	0.133	98.758						
69	0.105	0.126	98.884						
70	0.101	0.122	99.006						
71	0.096	0.115	99.122						
72	0.091	0.109	99.231						
73	0.089	0.108	99.339						
74	0.079	0.096	99.434						
75	0.075	0.090	99.524						
76	0.066	0.079	99.603						
77	0.065	0.078	99.681						
78	0.055	0.066	99.748						
79	0.050	0.061	99.808						
80	0.048	0.058	99.867						
81	0.043	0.052	99.919						
82	0.038	0.046	99.965						
83	0.029	0.035	100.000						

Extraction Method: Principal Component Analysis.

Annexure 2

Table No. 6 Rotated Component Matrix[a]								
	Component							
	1	2	3	4	5	6	7	8
System5						0.612		
System7								
System6								
System8			0.504					
System10								0.724
System11								0.795
System12								0.825
Systen14			0.707					
System15			0.602					
R1				0.764				
R2				0.642				

	Component							
	1	2	3	4	5	6	7	8
R3				0.655				
R4				0.694				
R5								
R6						0.637		
R7						0.565		
R8						0.525		
R9								
R10								
IP1		0.852						
IP2		0.874						
IP3		0.865						
IP4		0.805						
IP5		0.804						
IP6		0.832						
IP7		0.842						
IP8		0.843						
IP9		0.812						
IP10		0.799						
IP11		0.829						
IP12		0.687						
IP13		0.760						
IP14		0.687						
IP15		0.645						
IS1			0.736					
IS2			0.803					
IS4			0.711					
IS5			0.575					
IS6							0.641	
IS7							0.650	
IS10							0.557	
C5	0.549							
C6			0.584					
C7			0.643					
C8			0.578					

	Component							
	1	2	3	4	5	6	7	8
C9								
C10				0.517				
LO3							0.533	
LO6			0.576					
LO7								
NI4								
NI5	0.538							
NI9	0.568							
NI10	0.601							
NI11	0.573							
NI14	0.611							
NI16	0.600							
NI18					0.519			
D1								
D2					0.695			
D3					0.646			
D4								
Strategy1	0.514							
Communication6	0.594							
Communication7	0.786							
Communication9	0.628							
AR2	0.684							
AR3	0.691							
AR4	0.716							
AR5	0.670							
AR7	0.726							
AR8	0.651							
AR9	0.539							
AR10	0.533							
PR1	0.677							
PR2	0.743							
PR3	0.602							
PR4	0.643							
PR5	0.682							

	Component							
	1	2	3	4	5	6	7	8
PR7	0.711							
PR8	0.697							
PR9	0.645							
NI2	0.505							
Extraction Method: Principal Component Analysis.								
Rotation Method: Varimax with Kaiser Normalization.								
a. Rotation converged in 10 iterations.								