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An Empirical Investigation of Intellectual Capital Affecting the Performance: A Case of Private Universities in Pakistan

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Abstract: The study focused to investigate the effect of intellectual capital on performance of private universities. There are two models used to examine the effect of latent independent variables on latent dependent variables. Two-step structural equation modeling used to test the models to regress the cause and effect relation. The findings depicted that there is very significant effect of intellectual capital on performance of private universities. Human capital, structural capital and relational capital have significant effect on the performance of private sector universities. Human capital is the major contributor in private universities that directly and indirectly affecting the structural and relational capital significantly. To generalize the results to universities the sample size need to increase by including public sector universities and further expand to other service sector.

Key words: Human Capital · Structural Capital · Relational Capital · Performance

INTRODUCTION

Intellectual capital is a new economic aspect of information age and this knowledge asset becomes a wealth of organizations. Managing intellectual capitals is a new approach in knowledge-based-organizations like universities, which is producing knowledge during their work activities [1]. Universities perform the basic functions of generation, sharing and transfer of knowledge. The prime assets of universities are human capital (faculty) and relational capital (students) besides structural capital. The wealth of a nation primarily resides in intangible capital, which includes human capital, the skills and know-how of the work force; includes relational capital, that is, the degree of confidence people have in society, as well as their ability to work together to a common purpose [2].

The intellectual resources are recognized, gathered, used and influenced to make value for organizations [3]. Intellectual resources included the unseen resources of organizations that can be benefited in terms value to stakeholders [4-6]. Intellectual capital is an exceptional, priceless and hard to copy asset of organization. It generates in the organizations and comprises knowledge and skill, decision-making procedures and applications and information systems [7]. All the abilities, knowledge, learning, practices, analytical capabilities and intelligence/intellect presents by a firm as a whole included in the elements of intellectual capital (human, structural and relationship capitals) [8, 9]. University as an organization has two basic functions. First, is creating of knowledge by research and learning and second one is to share knowledge with students [10]. Many tangible and intangible factors are affecting the performance of universities. Among them, the intellectual capital is the vital resource that affects the performance. The objective of this research is to assess the perception of faculty members regarding the intellectual capital and performance of private universities. To evaluate the effect of intellectual capital, study has analyzed the effect of three main dimensions of intellectual capital as independent variables, namely human capital, structural capital and relational capital on the dependent variable performance.

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Research Question: To what extent, intellectual capital is directly affecting the performance of private universities? To what extent elements of intellectual capital (human capital, structural capital and relational capital) are directly and indirectly affecting the performance of private universities? To what extent human capital, structural capital and relational capital are directly and indirectly interacting with each other?

Literature Review

Intellectual Capital: Intellectual capital is the possession of knowledge, experience, skills, good relationships and technological capacities, used to give competitive advantage [11]. It is the combination of the human, organizational and relational resources and activities of an organization. It includes the knowledge, skills, experiences and abilities of the employees; the R and D activities, the organizational routines, procedures, systems, databases and intellectual property rights of the company; and all resources linked to the external relationships of the enterprise, such as with customers, suppliers, R and D partners etc [12]. Intellectual capital consists of three main types of capitals which were: a). Human Capital that includes all the knowledge, skills and experiences of employees of the organizations; b). Structural Capital that includes the overall system and programs an organization utilize to perform well; c). Relationship Capital that includes the relationships of organization with its stakeholders (customers, suppliers, alliances and partners etc) [13].

Human Capital: Nowadays, knowledge is the strength of organization's life and the value making ability of the organization, which is dependent upon the learning, knowledge and competences of its employees [14]. Human capital is the knowledge that the university's faculty/employees (teachers, researches, PhD students and administrative staff in this case) would take with them if they left the institution [15]. Human capital represented the individual knowledge stock of an organization. Employees generated knowledge through their competence, skills, attitude, experience and education [13]. Human capital is recognized as the largest and the most important intangible asset in an organization. Ultimately, human capital provides the goods or services for customers and provides solutions to their problems. Human capital includes the collective knowledge, competency, experience, skills and talents of employees [11]. Human capital is essential because it is the source of innovation and strategic renewal [16]. Human capital, is an important resource that improve effectiveness and efficiency of organization [17]. Human capital represented the organization's stock of knowledge of employees that improve the performance [18]. It improves business processes [19]. Human capital contains factors as employees' knowledge, skill, capability and attitudes in relation to fostering performances [20]. Human capital contains the elements as worker's learning, aptitude, capacity and expertise in relation to promoting performances [21].

Structural Capital: it is the substantial component of a firm, for example, exclusive information arrangements, records, programming, system, schedules, processes and deliverance systems. It likewise called an organizational capital [22]. Structural capital refers to the information that stays with the organization after the representatives left around evening time. It incorporates manufacturing procedures, IT, client relations, research and development and so on [23]. Structural capital expected to communicate information successfully, expand combined learning, reduce knowledge and training time and enhance the efficiency of human capital. The structural capital includes four components: structure, strategy, system and culture [24].

Relational Capital: It refers to the relationship between organization, clients, suppliers and allies, which is essential to enduring benefit making and profitable organizational practices [24]. Customer/relational capital is the knowledge contained in the advertising, promotional and selling practices and network of association [13]. Relational capital is a set of relations of the organization with the outside. It incorporates the relations with environment and particularly with the investment operators who take part in different stages from the value chain of the items like the suppliers, the contender and the customers [25-28]. Relational Capital characterized as all assets connected to the outer associates of the organization, for example, "clients", "suppliers", research and development allies, Government and so on, [29].

Theoretical Framework: It represents the logical association between independent and dependent variables. In this theoretical framework, the study

investigated the direct effect of intellectual capital on performance. In addition, the cause-effect association between elements of intellectual capital: human capital, structural capital and relational capital with the performance was also measured.

Relationship Between Variables: Three constructs affect each other [28-31] for example, human capital without the support of structural capital is practically useless. The relationships between sub components of intellectual capital and business performance [13] are positive. There is an association between intellectual capital and performance in the knowledge-intensive service industry [32]. The basic three elements of IC i.e., human capital, structural capital and customer capital were related to business performance [13]. There is a direct impact of intellectual capital elements on business performance [29], as well as the relationship among intellectual capital elements in information technology (IT) industry [26]. Intellectual capital enhances organizational performance and intellectual capital has significant positive effects on companies' performance [33].

The influence of human capital and structural capital create the business value [12]. Intellectual capital, particularly structural and human capital, was perceived by Russian managers of small innovative enterprises to be a primary determinant of enterprise performance [34]. Intellectual capital of firms has direct association with performance [30]. The three sub-constructs of intellectual capital together have a positive and substantive association with business performance [3]. There is a strong relationship between successful development of intellectual capital and organizational performance and found firms with the highest level of intangible assets clearly performed better than those with lower levels [35, 36]. There was a significant positive correlation among the three dimensions of intellectual capital (human, structural and relational) and business performance and a positive correlation among these three capitals [24].

The current study used two models to investigate the effect of intellectual capital on performance of universities. First model examined the direct effect of intellectual capital on performance. The second model investigated the direct and indirect effect of elements of intellectual capital: human capital, structural capital and relational capital on performance of universities in private sector.

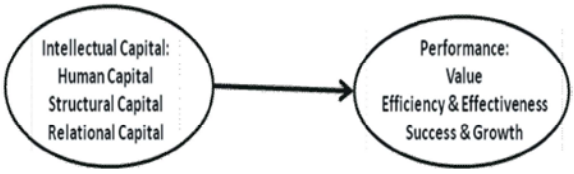

Fig. 1: Model 1

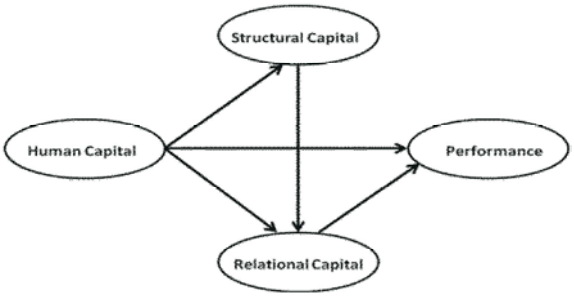

Fig. 2: Model 2

Hypothesis Development: The study is interested in examining causal effect of independent variables on dependent variables. The model 1 in figure 1 tests the direct effect of intellectual capital as exogenous variable on latent dependent variable performance. The model 2 in figure 2 investigates the direct and indirect effects of human capital, structural capital and relational capital on performance. Therefore, the hypothesis used for model 1 is H_1 and 8 hypotheses used for model 2 from H_{2a} to H_{2h}, which are as follows:

H_1: There is a significant effect of intellectual capital on organizational performance.

H_{2a}: There is a significant effect of human capital on organizational performance.

H_{2b}: There is a significant effect of human capital on structural capital.

H_{2c}: There is a significant effect of human capital on relational capital.

H_{2d}: There is a significant effect of structural capital on relational capital.

H_{2e}: There is a significant effect of relational capital on organizational performance.

H_{2f}: Human capital has indirect effect on relational capital mediated by structural capital.

H_{2g}: Human capital has indirect effect on performance mediated by structural capital and relational capital.

H_{2h}: Structural capital has indirect effect on performance mediated by relational capital.

MATERIALS AND METHODS

Methodology: The research is analytical and descriptive in nature to analyze the research questions of the study.

Data Collection: The procedure used for data collection was survey. The questionnaires were distributed personally to 500 faculty members in private universities. From which only 352 questionnaires were received back. After editing, only 325 questionnaires were used to enter in the SPSS for further analysis. The response rate was 65 percent.

Variables and Measuring Scale: Researcher used 5-point likert scales for variables [13]. The measuring scale was 5-point likert scale in which 1 represented the strongly disagreed, 2 represented disagreed, 3 stands for neither disagreed nor agreed, 4 represented the agreed and 5 represented the strong agreement of respondent's perception.

Sample Size: it is important to determine the minimum sample size required in order to achieve a desired level of statistical power. Researcher mentioned that although sample size needed is affected by the normality of the data and estimation method that researchers use, the generally agreed-on value is 10 participants for every free parameter estimated [37]. There is a little consensus about the recommended sample size for structural equation model [38]. In other words, as a rule of thumb, any number above 200 is understood to provide sufficient statistical power for data analysis. Therefore, the study used sample of 325 for analyzing the data.

Data Analysis Techniques: The analysis technique consisted of two-step structural equation modeling (SEM). In the first step, the confirmatory factor analysis was used to measure the reliability coefficients. In the second step, the effect of independent variables on dependent variable was measured. The descriptive analysis was also the part of initial analysis. The structural equation modeling (SEM) could effectively address the cause-and effect relationship of latent variables and evaluates the direct / indirect effects of standard regression coefficients (β) by using the AMOS software. Bootstrapping was performed to test significance of indirect effect of independent variables on dependent variables.

RESULTS AND DISCUSSION

Reliability Analysis and Descriptive Statistics: The sample includes the 325 faculty members of private universities. They have mixed level of experiences with different level of educations. The sample includes 277 male and 48 female faculty members. There were 41 participants having more than 20 years of experience in which three were females and 38 were males. There were 40 sample participants from private universities who have experience of 16 top 20 years (36 males and 6 females). There were 59 faculty members having experiences of 11 to 15 years (46 males and 13 females); 55 respondents having 6 to 10 years experience (46 males and 9 females); and 84 participants have 1 to 5 years of experiences (77 males and 7 females) respectively. Fifty participants have PhD degree, Thirty-two have MS level educational background and majority of faculty participants (210) of the study have masters level degree. Only four female participants have PhD level education; five have MS level degree and 33 female participants of sample have master's level degree.

The 27 sample participants have professor level position in which only one was female. From 14 associate professors only two women are associate professors. Only five female faculty members have assistant professors. The majority of male (210) and female (39) were working as lecturers in private universities.

The descriptive statistics in Table 1 showed that human capital has highest mean value among all three capitals and structural capital has smallest mean value. Similarly, human capital has highest variance around the mean and structural capital has smallest value. Value of skewness and kurtosis were below $\pm$ 2, described the normality of data.

The inter-item coefficients cronbach alphas in Table 2, for all variables were above 0.7. In first step of structural equation modeling, the confirmatory factor analysis was conducted to check the reliability and covariance of variables. The composite reliability estimates in Table 2 for human capital, structural capital,

Table: 1: Descriptive Statistics

	Human Capital	Structural Capital	Relational Capital	Performance
N Valid	325	325	325	325
Mean	16.97	9.81	13.53	23.81
Std. Deviation	5.51	3.49	4.22	7.41
Variance	30.35	12.17	17.82	54.95
Skewness	-.47	-.21	-.29	-.38
Kurtosis	-1.13	-1.30	-1.08	-1.09
Minimum	6.00	3.00	4.00	8.00
Maximum	25.00	15.00	20.00	35.00

Table 2: Reliability Coefficients

Variables	No. of Items	Cronbach α	Composite Reliability
Human Capital	5	0.878	0.878
Structural Capital	3	0.869	0.873
Relational Capital	4	0.858	0.860
Performance	7	.916	0.817
Total Items	19	-	-

Table: 3: Covariance Estimates of Confirmatory Factor Analysis

			Estimate	S.E.	C.R.	P
hmc	<-->	scm	.64	.09	6.85	***
hmc	<-->	rcm	.50	.08	6.35	***
scm	<-->	rcm	.73	.09	8.22	***
hmc	<-->	pfm	.61	.08	7.23	***
scm	<-->	pfm	.65	.09	7.55	***
rcm	<-->	pfm	.65	.08	8.14	***

Note: x^2=3.15, CFI =0.92, TLI =0.91, RMSEA = 0.08

Table: 4: Direct Effect of Intellectual Capital on Performance

	Std. β	S.E.	C.R.	P	R^2
Performance <--- Intellectual Capital	.81	.02	12.16	***	0.65

Note: *x^2 =2.94, CFI =0.97, TLI =0.96, GFI=0.95, RMSEA = 0.08*

Table 5: Correlation Coefficients

	Human Capital	Structural Capital	Relational Capital	Performance
Human Capital	1			
Structural Capital	.484**	1		
Relational Capital	.459**	.656**	1	
Performance	.523**	.559**	.690**	1

**. Correlation is significant at the 0.01 level (2-tailed).

relational capital and performance were also larger than 0.7. The covariance results of confirmatory factor analysis in Table 3 showed that all the critical ratios were above cutoff point of +2 and significant at p less than 0.001. The model fit results of confirmatory factor analysis shown in Table 3, depicted that discrepancy ratio is smaller than 5. The RMSEA (root mean square error of approximation) is 0.08. Both the indices TLI (Tucker-Lewis coefficient) and CFI (comparative fit index) are closer to 1.

In second step of structural equation modeling, the two models used to analyze the direct and indirect effect of independent variables on dependent variables. Both models were recursive with sample size of 325. The variables of the model 1 were intellectual capital and performance. The standardized coefficient estimates (β), critical ratios (c.r.), standard error (S.E.) and significance values (p), shown in Table 4. The critical value (12.16) was larger than cut off point of ± 2 at significant level of 0.001 for model 1. The intellectual capital has strongly affected the performance of private universities. There was 65% effect of variation in the performance occurred in private universities due to intellectual capital. Therefore, hypothesis H_1 was accepted.

The correlation values for model 2 in Table 5 were all significant and positive. The correlation of human capital with structural capital; human capital with relational capital; and human capital with performance were 0.484**, 0.459** and 0.523** respectively. The correlation results of structural capital with relational capital and with performance were positive and moderate 0.656** and 0.559**. There is positive moderate significant correlation (0.690**) of relational capital with the performance.

The model 2 used to test the direct and indirect effect of elements of intellectual capital on each other and on the performance of private universities. The critical values in table 6 were above the cutoff point of + 2. The direct effect of human capital on structural capital (c.r. = 7.94, β = 0.52 at p<0.001) was highly significant. Human capital has direct effect with the relational capital (c.r. = 2.65, β = 0.16 at p<0.01). Moreover, human capital highly significant direct effect with the performance of private universities (c.r. = 4.40, β = 0.24 at p<0.001).

Table 6: Regression Estimates For Model 2

	Std. β	S.E.	C.R.	P
Structural capital <--- Human capital	.52	.06	7.94	***
Relational capital <--- Human capital	.16	.05	2.65	.01
Relational capital <--- Structural capital	.65	.06	9.28	***
Performance <--- Relational capital	.65	.08	9.33	***
Performance <--- Human capital	.24	.05	4.40	***

x^2=3.12, CFI =0.92, TLI =0.91, GFI=0.87, RMSEA = 0.08

Table 7: Bootstrapping Results

	Total Effect			Direct Effect			Indirect Effect		
	hmc	stc	rlc	hmc	stc	rlc	hmc	stc	rlc
stc	.52$^{(0.00)}$	-	-	.52$^{(0.00)}$	-	-	-	-	-
rlc	.50$^{(0.00)}$	.65$^{(0.00)}$	-	.16$^{(0.01)}$	.65$^{(0.00)}$	-	.34$^{(0.00)}$	-	-
pfm	.57$^{(0.00)}$	.42$^{(0.00)}$	.65$^{(0.00)}$	.24$^{(0.00)}$	-	.65$^{(0.00)}$	.33$^{(0.00)}$	.42$^{(0.00)}$	-

0.00 Significant at $p < 0.001$, 0.01 Significant at $p<0.01$

Note: hmc = Human Capital, stc= Structural capital, rlc= Relational Capital, pfm=Performance

Structural capital significantly affected the relational capital of private universities (c.r. = 9.28, $\beta = 0.65$ at $p<0.001$). In addition, relational capital has direct significant effect on the performance (c.r. = 9.33, $\beta = 0.65$ at $p<0.001$). The model fit indices in Table 6 showed that discrepancy ratio was less than 5. The TLI and CFI were above 0.9. The root mean square error of approximation was 0.08. Bootstrapping results in Table 7, confirmed the significance level of direct and indirect effect of variables at 2000 number of bootstrap samples. The direct effect of human capital on relational capital was significant at $p \leq 0.01$. All the indirect effects were significant at $p < 0.001$. The results of SEM path of model 2, showed a perfect fit of the model and supported the hypotheses used from H_{2a} to H_{2h}.

CONCLUSIONS

This study focused on the perception of faculty members at professors, associate professors, assistant professors and lecturers of private sector universities in Pakistan. The structural equation modeling technique was used to examine the influence of intellectual capital on performance of universities in two models. The analysis of SEM supported the hypotheses in both the models. On the bases of SEM results, it is confirmed that the conceptual models are good to fit the data adequately.

The perception of faculty employees in private universities confirmed that intellectual capital has significant effect on performance of universities. These results were consistent with other studies [12, 13, 16, 32, 28, 31]. The correlations between elements of intellectual capital and with performance are significantly positive in model 1 and 2. The independent latent variables have significant strong positive effect on dependent variables to accept the hypotheses H_1 for model 1 and accepted hypotheses H_{2a} to H_{2h} for model 2.

The correlations between observed variables were positive. All the model fit indices were closer to standard points to prove perfect fit of model. All elements (human capital, structural capital and relational capital) of IC are significantly contributing in creating the value, increasing efficiencies and effectiveness and achieving success and growth for private universities. The private universities are providing better facilities to their faculties to compete in the education industry. The development in the human capital by giving them training and support improves the performance of organizational capital. The universities allocate adequate budget to improve the processes. The performances of private universities are ultimately dependent on processes and information technology used in these universities. The processes and procedures to run efficient and effective information system enhance the relationship with customers of private universities. The faculty capabilities of private universities rely on the infrastructure and facilities provided to them.

Recommendations: This study suggests that private universities need to realize the importance of human capital to facilitate them to improve their degrees and research activities. If the universities have good system, processes and infrastructure then these will improve the image of private universities. These results indicated that private universities can improve their performances through better management of their intellectual capital and can compete with the public sector universities for customers.

Future Research: The study is limited only to the private sector universities and the opinion of public sector universities need to consider for further comparative analysis. The other limitation of the study is that sample needs to include all employees segments and students to collect data about the intellectual capital and performance. The sample needs to increase and include public sector universities too. For future research, the mediating effect of universities type will add a comparative understanding related to intellectual capital on performance of universities. The influence of IC in government organization will add useful knowledge in the literature.

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