Full Length Research Paper

Simple and multiple relations between strategic human resource management and intellectual capital in Iranian higher education

Susan Bahrami[1]*, Saeed Rajaeepour[1], Mohammad Hossein Yarmohmmadian[2] and HassanAli BakhtiarNarsabadi[1]

[1]Faculty of Education and Psychology, University of Isfahan, Isfahan, Iran.
[2]Health Management and Economic Research Center, Isfahan University of Medical Sciences, Isfahan, Iran.

The aim of this study was to investigate the relationship between strategic human resource management (SHRM) practices and intellectual capital (IC) in Isfahan state universities. A multiple correlational survey design with a stratified random sampling (n = 492) was utilized. The SHRM practices questionnaire based on Chen and Hung's study (2009), first tested locally through a pilot study and then IC questionnaire adopted from Torres (2006) were administered. On the whole study sample the questionnaires' face and content validity confirmed by experts and their reliability were estimated 0.95 and 0.93 respectively through Cronbach's alpha coefficient. SHRM practices and IC components mean scores were lower than mean criteria. Statistically significant multiple relationships were found between SHRM practices and IC. Beta coefficients among SHRM practices and IC components were significant and regression model was also significant.

Key words: Strategic human resources practices, intellectual capital, human capital, structural capital, relational capital.

INTRODUCTION

If a knowledge-based economy is mainly characterized by the production, transmission and dissemination of knowledge, universities are unique in all these processes, "due to the key role they play in the field of research and utilization of its results" (European Commission, 2003b). Universities' main goals are the production and diffusion of knowledge, and their most important investments are in research and human resources. Despite the fact that their main inputs and outputs are basically intangibles, there are very limited instruments to measure and manage them (Canibano and Sanchez, 2004).

Strategic human resource management (SHRM) has been defined as the planned pattern of human resource (that is workforce) and human resource management (that is, functional) deployments and activities intended to enable the organization to meet organizational goals and objectives (McMahan et al., 1999). Human resource practices (HR practices) are the primary means by which firms can influence and shape the skills, attitudes, and behavior of individuals to do their work and thus achieve organizational goals (Collins and Clark, 2003).

Owing to the increasing importance of HR practices to the competitive advantages of firms in the rapidly changing knowledge-based economy, some scholars have paid attentions to examine the determinants of the adoption of HR practices (Tannenbaum and Dupuree-

Bruno, 1994).

SHRM is gaining increasing importance because strategic management, in a knowledge-based economy, emphasizes that employees should be considered a primary component for attaining a competitive advantage (Barney and Wright, 1998).

Strategic human resource management (SHRM) focuses on aligning internally consistent human resource management (HRM) practices to build employees' knowledge, skills, and abilities in an effort to support competitive strategies and achieve business objectives (Huselid et al., 1997). These practices are classified in different ways: Delery and Doty (1996), drawing on three dominant modes of theorizing, identify seven key "strategic human resource practices", including career ladders, training, results-oriented appraisal, compensation, employment security, employee voice, and broadly defined jobs, and use them to develop theoretical arguments consistent with each of the three perspectives. In addition, Collins and Clark (2003) explore the black box between "strategic human resource practices", which include training, performance assessment, rewards, and firm performance from a field study with 73 high tech firms. The results show that top managers' social networks mediate the relationship. Chen and Huang (2009) introduce these functions as training, compensation, performance evaluation, staffing and participation. Some strategic HR practices, such as staffing, training, participation, performance evaluation, and incentive compensation, are related to enhancing commitment, lowering turnover, and increasing performance through their impact on employee development and motivation (Guthrie, 2001).

Staffing mainly aims at attracting maximum number of very talented applicants and selecting the best to attain competitiveness. The procedure entails concerted efforts by management to ensure completion enduring success of organizational strategy. Cascio (2006) argued that without excellent induction, the execution of organizational strategy may vacillate. Effective selection system based on modern and need-based tests is necessary to affect desirable selection. Substantial resources are needed to ensure the efficiency of these selection tests (Khan, 2010).

In knowledge economy, competencies growth forms an necessary dimension for organizations' competitiveness. Knowledgeable and highly skilled employees get better productivity, improve quality of products and services, affect positive changes in processes and bring quality service to customers. Training and development generate tangible outcome (improved productivity, quality of products and services, and resource optimization), and intangible results in terms of enhanced self esteem, high morale, and satisfaction of employees due to acquisition of additional knowledge, skills, and abilities. Kundu (2003) stressed that companies should invest heavily in training the workforce for implementation of customer focused strategy.

Performance appraisal is based on established achievement of performance objectives recognized pertaining to a specified job in a given time period. This procedure plays a vital role in influencing the insight of employees about self and about their contribution to organizational goals.

Researchers established that employees' participation in setting performance goals, clarity about performance standards, flexibility of the system to respond to the changing needs, and employee right to appeal against performance evaluation are vital attributes of an effective performance appraisal that contributes toward superior performance by workforce (Islam and Rasad, 2006; Sidin et al., 2003; Webb, 2004; Wu, 2005).

A comprehensive compensation mix augmented by an efficient system of payment plays an effective position in attracting the most excellent candidates, shaping employees, behavior and performance outcome, and facilitates retention of talents.

These studies concluded that an effective compensation and reward system increases sales, reduce staff turnover, and improve organizations' performance (Chiu et al., 2002; Batt, 2002; Dreher and Dougherty, 2005).

Employee participation is characterized by wide ranging HRM related behavior primarily focused on employee management. These practices comprise employees sharing schemes, cooperatives, work democracy, unions, employees' participation, HRM and high promise work practices, team working, collective bargaining, employee empowerment, employee partnership in providing input in strategic decision making, and employees' right of information sharing at all levels (Summers and Hyman, 2005).

Thus organizations can use strategic HR practices to influence the behavior and expectations of employees. Human capital is also a valuable resource of firms (Wright et al., 2001). Organizations that effectively manage and leverage the knowledge and expertise embedded in individual minds will be able to create more value and achieve superior competitive advantage (Scarbrough, 2003).

Intellectual capital (IC) has become a major issue not only for academicians, but also for governments, regulators, enterprises, investors and other stakeholders during the last decade (Sanchez and Elena, 2006). Universities' main goals are the production and diffusion of knowledge, and their most important investments are in research and human resources. Considering the fact that their main inputs and outputs are basically intangibles, there are very limited instruments to measure and manage them (Canibano and Sanchez, 2004). Intellectual capital, a term first introduced by economist John Kenneth Galbraith in 1969, refers to the differentiation between an organization's market value and book value. Several researchers have come to

consider intellectual capital as an organization's primary means of creating competitive advantage. The abstract and dynamic nature of intellectual capital makes it complex for scholars to define (Stewart, 1997). Guthrie (2001) comments that many consider intellectual capital and intellectual assets or intangible assets as synonyms. Prior studies point out that intellectual capital is the creation of dynamic production processes, and is intimately associated to knowledge management or organizational learning (Lynn, 2000; Kaplan and Norton, 1992). Several researchers argue that accumulating intellectual capital is valuable to create competitive advantage (Edvinsson and Malone, 1997; European Commission, 2005b). Intellectual Capital (IC) has been defined as the combination of intangible resources and activities that "allows an organization to transform a bundle of material, financial and human resources in a system capable of creating stakeholder value"(Marr et al., 2004).

In the light of afore-mentioned literature, in this study intellectual capital is defined the total capabilities, knowledge, culture, strategy, process, intellectual property, and relational networks of an organization so that it can achieve competitive advantages and its goals. In this sense, Marr and Roos (2005), when referring to firms, highlight the dynamic interaction between Intellectual Capital and other resources. Such interaction is essential to deliver organizational performance. In fact it is the interaction among the different types of capital that creates wealth within an organization. The IC components recognized in most literature are Human Capital, Structural Capital and Relational Capital. The definitions, although initially established for companies1, can be easily adapted for Universities and Research institutions:

- **Human capital** is defined as the knowledge that the human resources (teachers, researches, PhD students and administrative staff in this case) would take with them if they left the institution.
- **Structural capital** is defined as the knowledge that stays within the institution at the end of the working day. It comprises the governance principles, the organizational routines, procedures, systems, cultures, databases, intellectual property, etc.
- **Relational capital** is defined as all resources linked to the external relationships of the institution such as "customers", "suppliers", R&D partners, Government, etc (Edvinsson and Malone,1997; Smylie and Wenzel, 2006; MERITUM, 2002).

Intellectual capital is, therefore, intellectual material—knowledge, information, intellectual property, experience—that can be put to use to create wealth" (Guthrie, 2001). "It has become standard to say that an organization's intellectual capital is the sum of its human capital (talent), structural capital (intellectual property,

methodologies, software, documents, and other knowledge artifacts), and customer capital (client relationships)" (Stewart, 1999).

Kong and Thomson (2006) found a positive and significant relationship between SHRM practices and human capital, structural capital and relational capital. Smylie and Wenzel (2006) studied the factors that affect the effectiveness of teaching – learning processes at Chicago universities and found that SHRM practices such as staffing, vocational development training, communication, reward and evaluation are among significant factors in this regard. Johnson and Kritsonis (2007) indicated that the effectiveness of strategic human resource planning is tied to effective staffing, selection, compensation, and in service training. Kong's study (2008) about the relationship between strategic management and intellectual capital revealed that intellectual capital has a greater impact on organizational processes than financial factors does, Intangible resources, in fact, are more vital than tangible factors in achieving completive advantage. If HRM strategies are intellectual- centered organization's intellectual capital will be improved significantly. Teo (2008) and his associates studied SHRM based one knowledge users' viewpoints and found significant relationship between SHRM and knowledge management systems as well as management and evaluation systems.

Rizov and Croucher (2009) empirically examined the relationship of HRM practices and organizational performance in European firms. Caliskan (2010) indicated that the impact of strategic human resource management practices on organizational performance. Ayanda and Sani (2010) found that strategic human resource management alignment with overall government objectives; line management devolvement, training and development, compensation, career planning system and employee participation are the most important strategic HRM practices that impacted more on organizational effectiveness in the public sector. Khan (2010) evaluates the effects of human resource management practices on organizational performance in Industry Pakistan. Lengnick-Hall et al. (2011) studied HR policies and practices within a strategic human resource management system can influence individual attitudes and behaviors so that when these individual contributions are aggregated at the organizational level through the processes of double interact and attraction–selection–attrition, the organization is more likely to possess a capacity for resilience. Longo and Mura (2011) examined the effect of intellectual capital on employees' job satisfaction and retention, and also identified two human resource management practices that positively influence intellectual capital. They identified two measures of human resource management practices (communication and alignment) that positively influenced intellectual capital.

An overview of previous studies indicates a lack of

adequate research about the relationship between SHRM and IC components in higher education institutions. The result present study can particularly be valuable for Iranian higher education authorities.

Aim

The main goal of this paper is to determine the relationship between of SHRM practices (staffing, training, performance appraisal, compensation, and participation) based on Chen and Hung's model (2009) and Intellectual capital indices (human capital, structural capital and relational capital) based on Torres's model (2006) concepted in Isfahan state universities. For this purpose, the faculty members were asked the following research questions:

1. To what degree are the SHRM practices carried out at Isfahan public universities?
2. What the amounts of intellectual capital indices are at Isfahan public universities?

Research hypotheses

1. There is significant relationship between SHRM practices and human capital.
2. There is significant relationship between SHRM practices and structural capital.
3. There is significant relationship between SHRM practices and relational capital.

METHODOLOGY

The present study employs a questionnaire survey approach and a descriptive correlational research method to collect data for testing the research hypotheses. Variables in the questionnaire comprise background information, SHRM practices and intellectual capital. All variables require ten-point range responses ranging from "strongly disagree" to "strongly agree". The population for the study includes 1830 faculty members in 5 universities including University of Isfahan, Isfahan University of Technology, University of Kashan, Isfahan University of Medical Science and Kashan University of Medical Science during 2010 to 2011 academic year. A stratified random sampling method was utilized to select 492 faculty members. The authors met the examinees in person and distributed 500 questionnaires. Of the 490 returned questionnaires, 10 were incomplete. The residual 480 valid and complete questionnaires are intended for the quantitative analysis. Data were collected through two questionnaires:

- Based on previous researches (e.g., Chen and Huang, 2009), the present study adopted five practices of strategic HR practices including staffing, training, participation, performance appraisal, and compensation and developed a forty six-item scale Questionnaire.
- Drawing upon prior researches (e.g., Torres, 2006), this study adapts three aspects, including human capital, structural capital and relational capital, in the construct of intellectual capital and developed development a thirty two-item scale.

The Cronbach's alpha coefficients in parentheses indicating the internal consistency reliability of the measures in the five factors are all above the suggested value of 0.70 (Torres, 2006). The staffing factor consists of nine items (α=0.86), training factor includes nine items (α=0.85), participation factor consists of nine indicators (α=0.93) performance appraisal factor uses nine items (α=0.90) and compensation factor includes nine items (α=0.81). The Human capital factor consists of nine items (α=0.81), structural capital factor includes thirteen items (α=0.88), relational capital factor consists of eleven indicators (α=0.85)

To analyze the differences in strategic HR practices and intellectual capital among university types, t-test, Fisher test, ANOVA, multiple regressions were employed. A multiple comparison post hoc test with least significant difference (LSD) was also used to determine which university types were significantly different from the others.

RESULTS

Demographic results

The sample consists of 396 men (82.5%) and 84 women (17.5%). 16.7% are lectures, 60.4% are assistant professors, 4.4% are associate professors and 4.4% are full professors. 26.9% are working at the Isfahan University, 23.3% at Isfahan University of Technology, 9.6% at Kashan University, 34% at Isfahan University of medical Sciences and 6.3% Kashan University of medical Sciences. Furthermore, 61.3% of respondents were married and 35% were single.

General results

Table 1 displays the means, standard deviation, and Confidence intervals of strategic human resource practices. Confidence intervals show that mean score of training is between 3.92 and 4.28, compensation between 3.62 and 3.92, performance appraisal between 4.4 and 4.77, staffing between 4.3 and 4.66 and participation between 4.23 and 4.64 with probability of 99%.

Table 2 displays the means, standard deviation, and confidence intervals of intellectual capital. Confidence intervals show that means score of human capital was between 4.89 and 5.21. Means score of structural capital was between 4.88 and 5.21 and relational capital was between 4.69 and 5.04 with probability of 99%.

Table 3 presents the results of multiple regression analysis regarding the effects of strategic human resource practices on human capital (p=0.000). Multiple correlation coefficients are 0.58 and modified determination coefficient is 0.328. So 32.8% of response variable can be explained by a combination of strategic human resource management practices.

Table 4 shows the results of coefficients of training and human capital are positive and significant. Coefficient of compensation and human capital is not significant (p=0.318). Coefficient of performance appraisal and human capital are positive and significant. Coefficient of

Table 1. Strategic HR practices mean, standard deviation, and confidence intervals ($\overline{X}$ =5.5, df= 479).

Indicators / Strategic HR practices	$\overline{X}$	S	SK	$\overline{X}_d$	tob	P	Confidence intervals (α = %99)
Training	4.1	1.49	0.67	-1.39	-20	0	3.92-4.28
Compensation	3.77	1.28	0.43	-1.73	-29	0	3.62-3.92
Performance appraisal	4.59	1.56	0.68	-0.91	-12.7	0	4.4-4.77
Staffing	4.48	1.52	0.64	-1.02	-14.59	0	4.3-4.66
Participation	4.43	1.73	0.65	-1.07	-13.55	0	4.3-4.64
Total	4.29	1.17	0.84	1.21	-22.4	0	4.16-4.43

Table 2. Intellectual capital mean, standard deviation, and confidence intervals ($\overline{X}$ =5.5, df= 479).

Indicators / Intellectual capital	$\overline{X}$	S	SK	$\overline{X}_d$	tob	P	Confidence intervals (α = %99)
Human capital	5.05	1.35	0.27	-0.45	-7.28	0	4.89-5.21
Structural capital	5.04	1.39	0.59	-0.46	-7.1	0	4.88-5.21
Relational capital	4.86	1.49	0.24	-0.62	-9.2	0	4.69- 5.04
Total	4.98	1.25	0.59	-0.51	-8.9	0	4.84-5.13

Table 3. Multiple regression between strategic human resource management practices and human capital

Indicators / Source	ss	df	ms	R	R^2	F_{ob}	P
Regression	292.33	5	85.46				
Residual	580.16	474	1.22	0.579	0.328	47.7	0
Total	872.5	479					

Table 4. Correlation between strategic human resource management practices and human capital.

Indicators / Strategic HR practices	β	Beta	Vif	tob	P
Constant	2.466	-	-	12.261	0
Training	0.164	0.182	1.36	4.167	0
Compensation	-0.04	-0.043	1.33	-0.99	0.318
Performance appraisal	0.14	0.164	2.16	2.17	0.003
Staffing	0.13	0.149	2.75	2.4	0.017
Participation	0.19	0.424	2.53	4.06	0

staffing and human capital is positive and significant. Coefficient of participation and human capital are positive and significant (p=0.000).

A variance inflation factors (VIFs) was utilized to examine the effect of multi co linearity. The values of the VIF associated with the predictors show a range from 1.33 to 2.75 which shows that there is no autocorrelation among them. So regression model is significant and
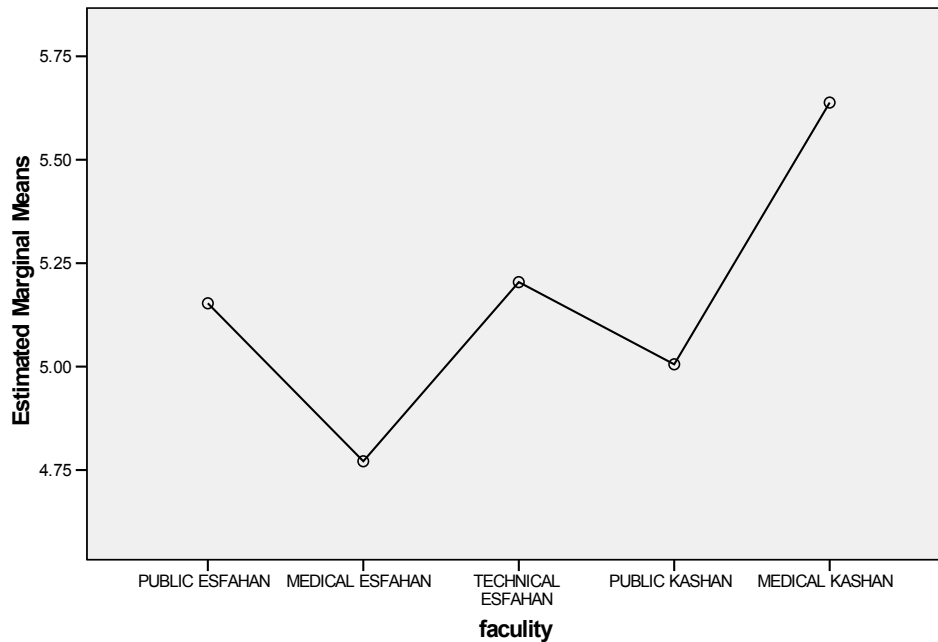
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Figure 1. Human capital mean profile in different educational departments.

Table 5. Multiple regression between strategic human resource practices and structural capital.

Indicators / Source	ss	df	ms	R	R^2	F_{ob}	P
Regression	399.5	5	79.9				
Residual	526.3	474	1.11	0.657	0.426	71.96	0
Total	925.58	479					

predictive model can be showed as follows:

$$Y = 2.46 + 0.164x_1 + 0.14x_2 + 0.13x_3 + 0.19x_4$$

The results of the analysis of variance (ANOVA): As predicted, significant differences in Strategic HR practices and human capital are found among faculty members. Etas square for sex, service background, age, university rank, university type are not significant. But Eta square for educational department is significant (Figure 1).

Results showed that calculated F value with 5 and 474 degrees of freedom in significance level of ($\alpha = 0.01$) is higher than critical value. So there is significant multiple correlation between strategic human resource practices and structural capital (p =0.000). Multiple correlation coefficients are 0.657 and modified determination coefficient is 0.426. Therefore 42.6% of response

variable can be explained by a combination of strategic human resource management practices (Table 5).

According to Table 6, Beta coefficient of training and structural capital was 0.07, compensation and structural capital was 0.04 which are not statistically significant (p = 0.3, p = 0.06). But Beta coefficients of performance evaluation and structural capital is 0.201, Beta coefficient of staffing and structural capital was 0.02 and Beta coefficient of participation and structural capital was 0.31 which are all statistically significant (p = 0.001). Variance inflation factor for predictor variables was between at least 1.33 and 2.75 which shows that there is no autocorrelation among them. So regression model is significant and predictive model can be showed as follow:

$$Y = 2.16 + 0.179 X_1 + 0.184 X_2 + 0.25 X_3$$

Analysis of covariance showed that observed F in level p

Table 6. Correlation between strategic human resource practices and structural capital.

Indicators SHRMP	β	Beta	Vif	tob	P
Constant	2.16	-	-	11.29	0
Training	0.071	0.076	1.36	1.88	0.06
Compensation	-0.043	-0.039	1.33	-0.987	0.32
Performance evaluation	0.179	0.201	2.1	3.9	0
Staffing	0.184	0.021	2.74	3.5	0.001
Participation	0.25	0.31	2.5	5.6	0
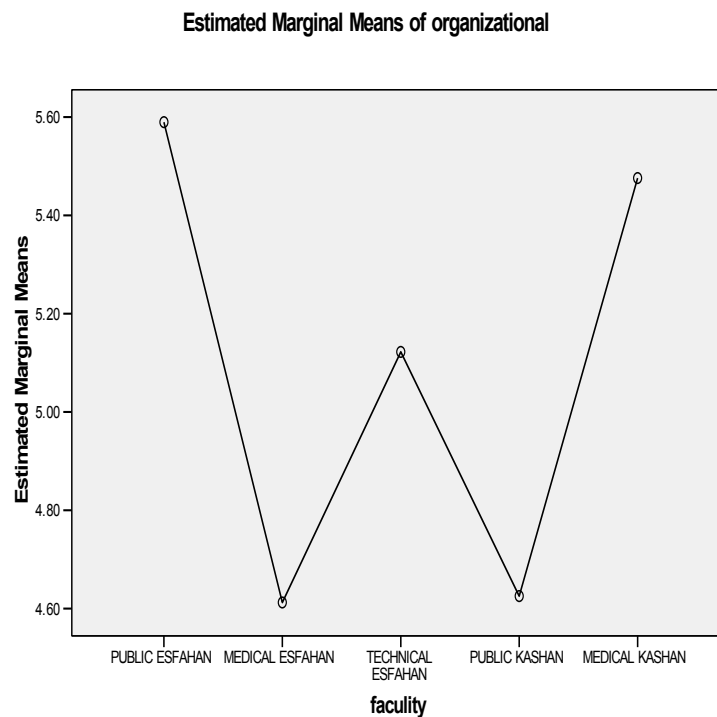
Figure 2. Structural capital mean profile in different educational departments.

≤ 0.05 for relationship between strategic human resource practices and structural capital according to demographic characteristics is significant. Eta square for sex was 0.01, for service background was 0.01, for age was 0.008 and for university rank was 0.01 which are not statistically significant. But Eta square for educational department was 0.04 (Figure 2) and for university type was 0.07 (Figure 3) which are statistically significant.

The results also showed that calculated F value with 5 and 474 degrees of freedom in significance level of (α = 0.01) is higher than critical value. So there is significant multiple correlation between strategic human resource practices and relational capital (p=0.000). Multiple correlation coefficients are 0.607 and modified determination coefficient is 0.361. Therefore 36.1% of response variable can be explained by a combination of strategic human resource management practices (Table 7).

According to findings of Table 8, Beta coefficient of training and relational capital was 0.225, Beta coefficients of compensation and relational capital was 0.097, Beta coefficients of performance evaluation and relational capital is 0.261, Beta coefficient of staffing and relational capital was 0.183 and Beta coefficient of participation and relational capital was 0.138 which are all statistically significant (p = 0.02). Variance inflation factor for predictor variables was between at least 1.33 and 2.75 which shows that there is no autocorrelation among them.
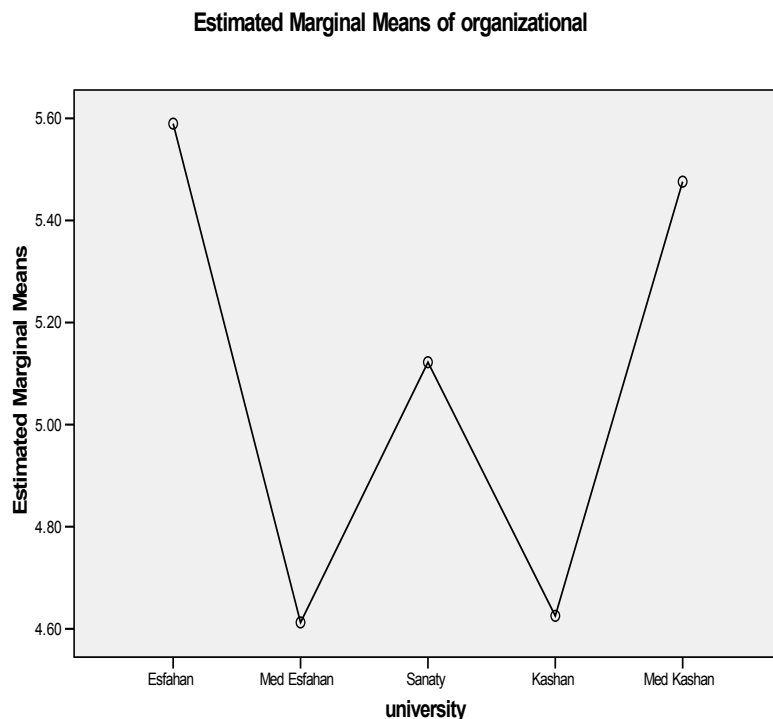
Estimated Marginal Means of organizational

Figure 3. Structural capital mean profile in different university type.

Table 7. Multiple regression between strategic human resource practices and relational capital.

Indicators / Source	ss	df	ms	R	R²	F_{ob}	P
Regression	395.2	5	79.05				
Residual	678.6	474	1.43	0.607	0.361	55.2	0
Total	1073.9	479					

Table 8. Correlation between strategic human resource practices and relational capital.

Indicators / SHRMP	β	Beta	Vif	tob	P
Constant	1.88	-	-	8.66	0
Training	0.225	0.225	1.36	5.29	0
Compensation	-0.11	0.097	1.33	-2.3	0.021
Performance evaluation	0.25	0.261	2.16	4.87	0
Staffing	0.18	0.183	2.75	3.03	0.003
Participation	0.12	0.138	2.53	2.37	0.018

So regression model is significant and predictive model can be showed as follows:

$$Y = 1.88 + 0.225\,X_1 + (-0.11)\,X_2 + 0.25\,X_3 + 0.18X_4 + 0.12X_5$$

Analysis of covariance showed that observed F in level p ≤0.05 for relation of strategic human resource practices and relational capital according to demographic characteristics is significant. Eta square for sex was 0.01, for service background was 0.01, for age was 0.008 and
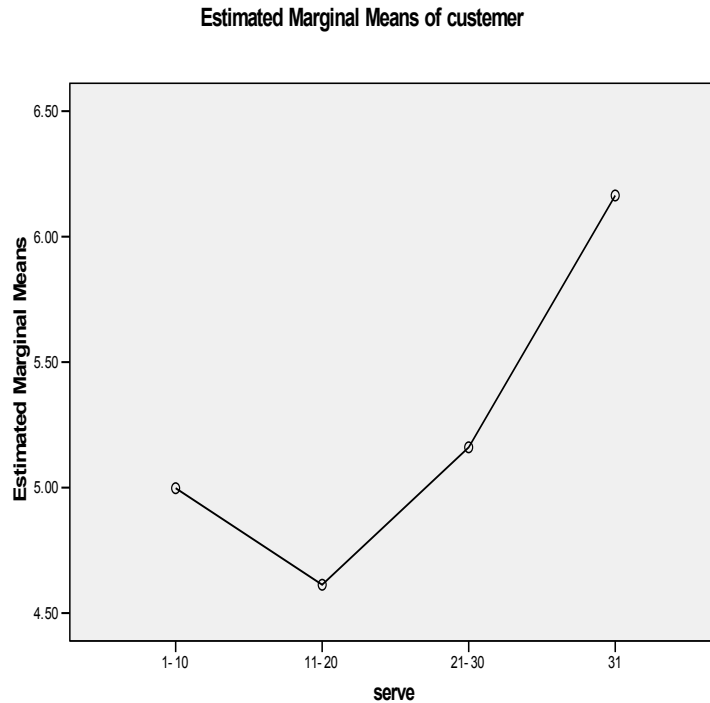
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Figure 4. Relational capital mean profile in different serve.

for university rank was 0.01 which are not statistically significant. But Eta square for educational department was 0.04 (Figure 4) which are statistically significant.

Limitation: this study was conducted among a particular population, namely, Isfahan university faculty members; and its results may not be comfortably generalized to other populations.

DISCUSSION

The findings indicates significant multiple correlation between SHRM practices (staffing, training, performance appraisal, compensation, and participation) and Intellectual capital (human, structural, and relational capital) (p=0.000). In the other words, effective SHRM can enhance intangible assets of a university. That is, intellectual capital by Kong and Thomson (2006) study had also showed a similar relation at Australian social service organizations. Smylie and Wenzel (2006) had, also found that the application of SHRM practices such as staffing, vocational development training, communication, appropriate teaching-learning strategies, rewarding, and evaluation would raise higher education effectiveness. Johnson and Kritsonis (2007) had also, indicated the critical role of selection, maintenance, rewarding, and training of personnel. Although, the amount of intellectual capital differs by university and

academic department, but human resource managers will be able to strengthen university competitive advantage through selecting and rewarding competent personnel. Academic departments, in particular, should take this matter into consideration as they intend to hire new faculty members. The science departments have achieved greater success in this regard, as they have been more innovative and productive. It is suggested that other departments follow their example if they intend to improve their human capital. Structural capital, however, is considered as a prerequisite to enhance human capital.

Conclusions

University administrators and policymakers should design and administer high quality training courses and workshops, flexible payment systems, and outcome-oriented performance evaluation systems, they should also encourage faculty members participation is decision making processes which can increase their knowledge and skills. As universities intellectual capital develops, they will be better prepared to cope with rapidly changing environment and outside competition.

Finally, future researchers are recommended to utilize instruments other than questionnaires (such as interview and checklist), and compare their findings with this research. Surveying other populations, particularly university planners and administrators may result in

different but more reliable information.

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