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Ac. J. Psy. Stud.
Vol. 3, Issue 3, 226-233, 2014
ISSN 2333-0821

Academic Journal of Psychological Studies
www.worldofresearches.com

ORIGINAL ARTICLE Received 25 Mar. 2014 Accepted 20 Apr. 2014

The Relationship between IT and Human Capital

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ABSTRACT: According to transmitting societies from industry age to information age, the importance of human capitals has been become more and more as intangible properties in business world. During industry age, cost value of assets, factories, equipment and materials was necessary for becoming successfully a business. But now, effective usage of intangible assets plays a key role in success or failure an organization. Accordingly, after a comprehensive review on conducted researches about human capital, IT and related issues, needed information was extracted from statistical population. Two standard questionnaires about human capital and IT were used to collect data. These questionnaires have been translated from original version of Research Company. Descriptive statistics such as standard deviation and frequency table and inferential statistics including confirmatory factor analysis and path analysis were used. Applications of SPSS version 18 and LISREL version 8.54 were used to analyze data. The results indicate that connection, adjustability, capability, facility and speed as IT components have a significant relationship with human capital .

Keywords: Human Capital, IT, Connection and Adjustability, Capability and Facility, Speed

INTRODUCTION

At the present age with growing knowledge – oriented economy, intangible assets of companies and their intellectual capital are a key factor for achieving sustainable competitive advantage. For this reason, attention to intangible items has been growth rapidly in various aspects including economy, accounting and strategic management. Knowledge is a competitive advantage which is paid attention in business strategies of organizations a way that knowledge production leads to continuous innovation and in turns it will lead to competitive advantage.

Beside with entering to knowledge – oriented economy, knowledge has more preferable in comparison with other production factors such as land, capital and machineries as in this economy, knowledge considers as the most important production factor and it is named as the most important competitive advantage of organizations[1].Now, organizations pay attention inevitably to knowledge management for improving performance and guarantying business stability and success. This requires reinforcement and attention to potentials and capacity of human resources until organizations can achieve competitive advantage by

continuous improvement and performance and show fast reactions to the changes of business environment and economic conditions[2].

Now organizations also are too able to survive in new paradigm of competition among organization, which is entirely a competitive and knowledge – oriented space, they should look a IT as a necessary strategy in the current age, while identify environmental changes and developments for dealing with them, identify influential organizational indexes on IT and give the most appropriate response to these changes[3] .

Theoretical Framework and Research Background

1. Theoretical Framework

- **Human Capital**

Human capital represents reserved organizational knowledge in employees. According to Ross et al., created intellectual capital by employees consists of competency, work style and their acuity. Competency includes skill and education and acuity is behavioral components of employees. From the perspective of Edwinson and Maloon, human capital consists of a mixed knowledge from skill, creativity and individual ability of employees. In this regard, Bontis [4] defines human capital as a combination of Genetic inheritance, education, experience, business and life style. Bontis describes human capital as cumulative capability of organization in extracting best solutions from individual knowledge of its employees. Exiting employees from organization can lead to drop organization memory off and a threat for continuing organizational activities[5].

- **Information Technology**

For surviving, all organizations need to new and novel ideas. These ideas are blown like a spirit in organization body and save it from doom and death. The advent of IT causes not only organizations are able to achieve competitive advantage, but also it provides a useful tool for promoting organizational performance[6].Generally, IT term encompasses all technological innovation and convergence in information and communication which our world converts to what is called information society and knowledge-oriented society. Secretariat of the high council of informatics in Iran provided following definition for IT in 2000:

- IT refers to an interconnected set of methods, hardware, software and equipment in communication that it collects, stores, restores, processes, transmits and or supplies information in various forms (sound, text and image). IT is core of a set of directed activities which undertakes centrally management, productivity, production, education and promotion of a system. In fact, IT is a combination of three areas of information, computer and communication[7].

2. Research Background

Delgado-Verde ET al.[8] studied the role and effect of human capital on organizational technological performance. The findings confirm significant positive effects of human capital on organizational technological performance.

Selvarajan et al. found convincing evidences that human capital provides proper ways for innovation, in turns, it influences on organizational performance.

Henfridsdon studied ambiguity role in usage of new IT in organizations. According to results of this research, if employees of an organization apply significantly meaningfully IT in organizational jobs, the application of these technologies will be facilitated.

Whittaker studied IT on executing guidelines and regulations in organization. The result showed that as a moderating factor, IT leads effectiveness in organization and job satisfaction in doing activities.

MATEREALS AND METHOD

The purpose of this research as it is applied research. According to the method of data collection for this study is the descriptive research to test the relationship between variables and significance of the estimated models, path analysis have been used. The purpose of this study, in terms of functional and data collection descriptive - survey. The purpose of the questionnaire and description of census variables are used. Cronbach's alpha for the reliability of the study according to the following formula is used:

$$r_{\propto} = (\frac{k}{k-1})(1 - \frac{\sum \sigma_j^2}{\sigma^2})$$

In this regard: $r_{\propto}$ total test reliability coefficient, k the number of questions (parts of) the test, σ_j^2 the variance (section) j, σ^2 total variance Questions (test) is. That said, if this ratio is greater than 0.7, the test of reliability is acceptable.

The validity of the questionnaire was confirmed by experts, ie reliability, content validity of the questionnaire used. Content validity is a credit check is usually a component of the measuring instruments used. To assess the validity of this questionnaire, the questionnaire was administered to some experts, all of whom confirmed the validity of the questionnaire and its constituent inquiries And to determine the reliability of the questionnaire, Cronbach's alpha was used spss software, In the first round, 20 questionnaires were distributed among respondents and obtained a Cronbach's alpha value equal to 0.716, because the value of 0.7 was larger, was confirmed. Secondly, the number of 20 questionnaires were distributed among respondents and obtained a Cronbach's alpha value equal to 0.95 was therefore given that the value of 0.7 was larger, was confirmed.

Path analysis software was used to analyze the data. Questionnaire was used for analyzing statistical descriptive and inferential issues. Descriptive statistics consist of frequency table, median and standard deviation and structural equations were used in inferential level including confirmatory factor analysis and path analysis. Used applications for analyzing data are SPSS version 18 and LISREL version 8.54 under windows.

RESULTS

1. Univariate Normality

After determining descriptive statistics of measurable variables of model in this phase, it is needed to determine distribution normality of variables. Kolmogorov – Smirnov test was used to show distribution normality of under – studied variables. The results indicate that the distribution is normal. In this test, null hypothesis is based on the normal distribution. If significance level is lesser than 0.05, under – studied variables will not be normal.

Table 1. Normal distribution of variables by kolmogorov – Smirnov test for IT questionnaire

Hidden variables of model	Kolmogorov – Smirnov amount	Sig
Competency	1.763	0.14
Adjustability	1.516	0.20
Connection	1.453	0.29
Speed	1.616	0.11
Differentiation	1.328	0.059
Capability and facilities	1.335	0.057
Novelty	1.558	0.016

As regards, all significance levels are upper than 0.05, then null hypothesis is accepted. So normal distribution of under – studied variables for estimating unknown parameters are reliable.

Table 2. Normal distribution of variables by kolmogorov – Smirnov test for IT questionnaire

Hidden variables of model	Kolmogorov – Smirnov amount	Sig
Human capital	0.704	0.704

In this questionnaire too, as regards all significance level are upper than 0.05, then null hypothesis is accepted. So normal distribution of under-studied variables for estimating unknown parameters is reliable.

Measurement Model or Confirmatory Factor Analysis in Human Capital Level

Table3. The difference of chi-square amounts in determining effectiveness of modification of initial model of measurement of human capital variable

Processed models			Df	RMSEA amount	reduce significantly of chi-square
First model	704.29	....	119	0.157	0
Second model (start modifying)	285.38	418.91	98	0.098	0
Third model	214.4	70.98	92	0.082	0
Fourth model	188.66	25.74	90	0.074	0

Reference: results of research

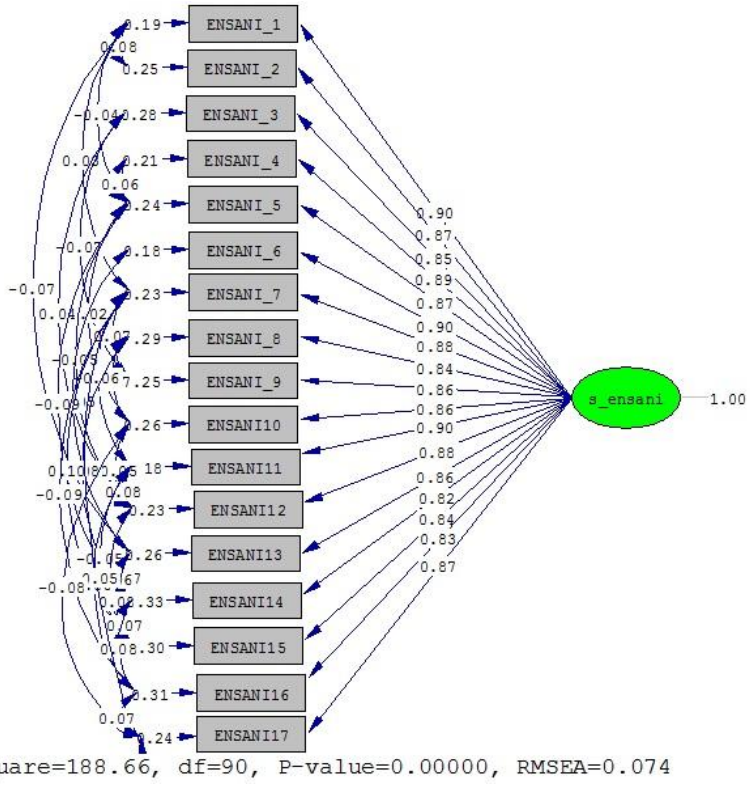

Fig 1.measurement of saturated human capital variable

According to these findings, we can make decision about the suitability of selected questions by researcher for measuring components and presumably removing pointless questions in any component than the original model. The amounts of square root of variance of the approximation error have been reached to acceptable value in fourth phase. Then estimated parameters are reliable statistically in fourth model and they can be used to match indicators with studied components.

Indicators approved correctly together their related structures as for the desired structure of researcher. Because present model has been performed properly using confirmatory factor analysis method and there is not significant overlap. As regards square root of variance of the approximation error for modified model is lower than reported 0.1, the results indicate that estimated parameters in the model are reliable statistically and they are used for adjusting indicators with studied components.

Fitness Index

The amounts of (Average squared residuals, Average squared standardized residuals, Elegance of index, Softened indicators of fitness, Not soft indicators of fitness, Increasing fitness index, Adaptive fitness index, Square root of the estimated variance of the approximation error) were used to consider a model, especially in comparison with other possible model, how well does for determining a set of observed data. The amounts of higher than 0.9 in these indicators show a

very well designed model in comparison with other possible models. Finally, because we consider how the model integrate fitness and save, very strong indicator of square root of variance of the approximation error was used. Indicator is the root of average of approximation squares. This indicator is 0.05 and lesser for good models. The models have 0.10 or upper, they have weak fit.

Table4. Fitness indexes of human capital variable

Index	Desirable amount	Reported amount
Average squared residuals	Close to zero	0.037
Average squared standardized residuals	Close to zero	0.024
Elegance of index	0.9 and upper	0.90
Softened indicators of fitness	0.9 and upper	0.99
Not soft indicators of fitness	0.9 and upper	0.99
Increasing fitness index	0.9 and upper	0.99
Adaptive fitness index	0.9 and upper	0.99
Square root of the estimated variance of the approximation error	0.08 and lesser	0.074

As above table shows there is a proper fitness between the data of this research and factor structure and the theoretical foundation of the research and this represents the convergence of questions with theoretical structures. After refining the variables related to independent variables, we can study measurement model in other dimensions.

Table5. Effect amount of independent variable in dependent variable

		Novelty	**Capabilities and facilities**	**Differentiation**	**Speed**	**Connection**	**Adjustability**	**Competency of employees**
Human capital	Effect amount	0.121	0.224	0.046	0.313	0.161	0.208	0.201
	Significance level	0.104	0.040	0.564	0.008	0.049	0.016	0.058

The Result of Testing Research Hypotheses based on Structural Model

- **Hypothesis 1. There is a significant effect between competency of staff and human capital.**

According to above model, it can be seen that effect amount is 0.201 and significance level is equal to 0.055. Because this amount is higher than 0.05, then there is not a significant effect.

- **Hypothesis 2. There is a significant effect between adjustability and human capital.**

According to above model, it can be seen that effect amount is 0.208 and significance level is equal to 0.016. Because this amount is lesser than 0.05, then there is a significant effect.

- **Hypothesis 3. There is a significant effect between connection and human capital.**

According to above model, it can be seen that effect amount is 0.161 and significance level is equal to 0.049. Because this amount is lesser than 0.05, then there is a significant effect.

- **Hypothesis 4. There is a significant effect between speed and human capital.**

According to above model, it can be seen that effect amount is 0.313 and significance level is equal to 0.008. Because this amount is lesser than 0.05, then there is a significant effect.

- **Hypothesis 5. There is a significant effect between differentiation and human capital.**

According to above model, it can be seen that effect amount is 0.046 and significance level is equal to 0.564. Because this amount is higher than 0.05, then there is a significant effect.

- **Hypothesis 6. There is a significant effect between capabilities and facilities and human capital.**

According to above model, it can be seen that effect amount is 0.224 and significance level is equal to 0.040. Because this amount is lesser than 0.05, then there is a significant effect.

- **Hypothesis 7. There is a significant effect between novelty and human capital.**

According to above model, it can be seen that effect amount is 0.121 and significance level is equal to 0.104. Because this amount is higher than 0.05, then there is not a significant effect.

DISCUSSION

In the past two decades, the topic of investment in IT was one of the most important issues which analyzed and studied by economists. At present, one of the most important topics is that if investment in IT has effect on productivity and efficiency or not? The importance of IT is increasing for companies and its impact feels widely in world business. This research tries to consider the effect of IT on human capital, as we can provide needed guidelines for developing IT in light of attention to intellectual capital. The results indicate that there is a significant

relationship between capabilities, facilities, connection, adjustability and human capital, while there is not this relationship between differentiation and competency of employees. There is a direct positive relationship among all mentioned components. Generally, it should be noted that IT enables managers provide more and better opportunities for communicating with environment. Greater participation in decision-making, increased identification of problems, reduced height of the organizational pyramid, improved coordination and increased specialized employees are only some effects of IT in organizations. The managers are permanently involved in decision – making for feeing and investing IT in their organizations; they must know that to what extent applying IT in organization is effective and useful.

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