Strategic management of information communication technology in Oil Pension Fund

Elham Khosravian[1] and Reza Radfar[2,]*

1Department of Management, Electronic Branch, Islamic Azad University, Tehran, Iran
2Department of Management, Science and Research Branch, Islamic Azad University, Tehran, Iran

ABSTRACT

Strategic management of information technology (IT) is one of the main factors of business and IT integration and achievement of competitive advantage and success of the organization. According to comprehensive growth of IT and its influence in different levels of organizations, necessity of using strategic plans in field of IT would be appeared more than before. At the present study, information is obtained through questionnaires in the population in retirement fund oil and then would be analyzed using inferential statistics through SPSS software.

INTRODUCTION

Information technology (IT) in third millennium is one of the most important tools for helping organizations to benefit from competitive advantages in the global area. Today, information has been changed into the most basic element for production beyond raw materials, capital, human resource and machinery. IT management has been changed constantly and it is being deformed due to growth of IT in companies (Moura, Sauve, Bartolini, 2008). At the current turbulent working environments, organizations have no way other than using IT as a strategic and value making resource to achieve their organizational targets. Naturally, information can be regarded as a crucial resource in decision making in successful organizations and optimized information management is essential for proper and effective completion of activities. IT is expected in all dimensions to be able to act successfully at the organizations and gain abundant advantages. Many organizations, companies and commercial firms can use IT to develop their business and more profitability in different aspects. Chaffey and Wood (2005) define IT as follows: technology resources that can be used for management of business information. The resources include software, hardware and communication networks used for information management. According to Irani and Love (2003) and Benemati (1997), IT changed fast and considering increase in strategic impact of IT on business and management operations is so significant.

IT management in simple concept means ability, skill and benefiting from digital software and tools (software and hardware equipment) for purpose of production, processing, maintenance, collection, storage, protection, distribution, transfer and retrieval of data and information in safe and secure mode to improve performance of the organization. In other words, IT management refers to managing study, design, develop, implement, support or management of information systems based on computer science, especially software and hardware programs with the observance of security affairs on infrastructural contexts, along with data transfer affairs. IT management needs public information of management and also relevant information of IT, experience in human resource affair, having working spirits, along with responsibility in management, perceiving rapid changes of technology and its effects on the business environment.

Business-driven IT Management (BDIM) is one of the new fields of IT management studies, which can make the expectation possible for the organizations. Accordingly, strategic planning is a process, in which targets, goals and plans are regulated and implemented (Kural, 2001). Using ideas of Olson and Idi (1982), strategic planning can be a regular and organized effort for making decisions and taking fundamental measures. Through that, it could be specified that what is an organization, what does and organization and why do that?

Strategic planning is a process, through which executive and operative senior directors design strategic planning of the organization. The most important feature of the process is hidden in its team work nature, since in frame of such process and team work, belief in organizational strategy can be formed and people involved in this process can have sense of belonging and possession to it. In addition, such process can facilitate step of centralization of organizational strategy (Patrick, 1997).

Sethi and Lederer have studied different methodologies in strategic planning of information systems and their effect on the organizations (Sethi and Lederer, 1988, 445-461). In this regard, strong conceptual tools such asMcFarlan's strategic networkmodel; stages of growth model by Nolan and structured methods such asCritical success factors of Rekart and business systems planning presented by IBM Company (Segars, 1998).

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In this study, the main issue is assessment of ICT strategic management, which has been conducted as case study on Oil Company Pension Fund. National Oil Company has donehuge investments in the last decade in the field of ICT; although experiences of managers indicate that one of the most important causes of failure of the investments on IT is inadaptability between IT and business.

Using IT at the organization
IT development at the organizations can be analyzed from different approaches. The approaches have resulted in presentation of some models for discrimination of how to use the technology at the organization.

Nolan has found 6 steps for use of IT in the organizations based on study of large number of them. The 6 steps are in fact based on 4-stage model of him and Gibson published in 1974 (Gibson and Nolan, 1974).

The 6 steps are respectivelygetting started using, distribution, control, combination and integration, data management and maturity (Nolan, 1979). At the first step, the technology can be applied to reduce operative costs. At the next step, the applications would be increased. In this step, organization encourages innovation and wide use of IT with presenting high freedom of action and low control. At the step 3, existing applications would be documented and improved. In this step, attitude of the organization would be changed from computers management to IT management. The main feature of this step is reconstruction and specialization of using IT to find more sustainability at the organization. At the next step, database technology, existing applications would be adapted with each other again. In this step, control on users would be increased. Step 5 is related to combination and integration of applications in organizational level. At the final step, integration of applications would be conducted in such manner that they can reflect information processes at the organization as it is presented in table 1.

Table 1: Nolan's model of IT application (based on Nolan 1979)

Step	Name	Application
1	Getting started	Reduction of operative costs
2	Distribution	Increase and development of applications
3	Control	Documentation and improvement of existing applications
4	Combination and integration	Adaptation of existing applications using database technology
5	Data management	Combination and integration of application in organizational level
6	Maturity	Integration of applications to reflect information at organization

Business-driven IT Management (BDIM)
IT management is being changed constantly and is being deformed due to growth of IT in companies. The currentmethods can be final result of 30 years continuous evolution of management of systems and management networks. According to increasing importance of IT management in business, a uniform and fixed attitude was created at the organizations at the end of 1980. The attitude is named BDIM (Moura, 2008).

BDIM refers practically to a new culture and a series of new tools and processes of decision making, which have been centralized to help business. On the other hand, BDIM can be considered as an effort for evaluation of the impact of IT on business and revise of IT management goals in operative, tactical or strategic fields. Being interested in BDIM is being increased and the reason is the benefit, which can be created for business through using it. Concept of BDIM can be assumed as the effort for new study, which acts using help of IT and with the aim of positive effect on management decision making and business actions such as benefit, loss and costs (Bartolini, 2011).

Evaluation of investment for ICT
Evaluation of investment in ICT would be usually conducted in comparison to other mechanisms and investment methods of the organization and for optimization of activities and systems. At the same time, the investments in field of research projects, innovation or providing industrial machinery and their renewal according to their effectiveness in quality of production and running organization management. Generally, investment evaluations in ICT can be regarded as cost consuming projects and return of the investment would be measured and calculated through benefiting from application and value added, which is created by information and communications for making decision and planning and controlling for management. Although using accounting methods for investment evaluation is difficult, today using quantitative economic criteria are being considered such as Parker method by 1988, which has considered 3 main factors for evaluation of investment, planning and implementing ICT systems (Momeni, 2001).

- Reengineering and replacement of systems for purpose of enhancing efficiency and effectiveness and optimizing them.
- Evolution of information and executive systems to increase productivity and desirability of systems and investments.
- Designing systems and innovation of new information systems with the aim of creating and using new opportunities for expanding organization's activities.

Only being relied on financial and economic evaluation of investment for ICT would not be competent for valuating investment and selecting proper decision making base, since many obtained results may be appeared intangibly such as skill level of employees and creating new spirits in them and providing good future opportunities to enhance productivity of the organization (Momeni, 2001).

Methodology
**Data collection method;**
Data collection in this study is a combination of library (using Persian and Latin library resources, papers, books and valid databases on internet) and field (referring to individuals) methods. In this study, data collection instrument has been available questionnaire in form of Likert scale (1.Very low; 2.Low; 3.Average; 4.High and 5.Very high). Validity of the questionnaire was confirmed by experts in this field and reliability of the instrument was also measured using Cronbach Alpha. As estimated alpha

was more than 0.7, reliability of the questionnaire was confirmed.

Statistical population and sample

Statistical population includes all employees of Oil Pension Fund Organization. The experts include managers, experts and members of Oil Pension Fund. Sampling for this study has been conducted in form of random cluster sampling method. For this purpose, through face to face reference, sample was selected randomly and then, available samples and suitable sample size was applied and 384 people were selected as sample using Krejcie-Morgan table.

Studied variables
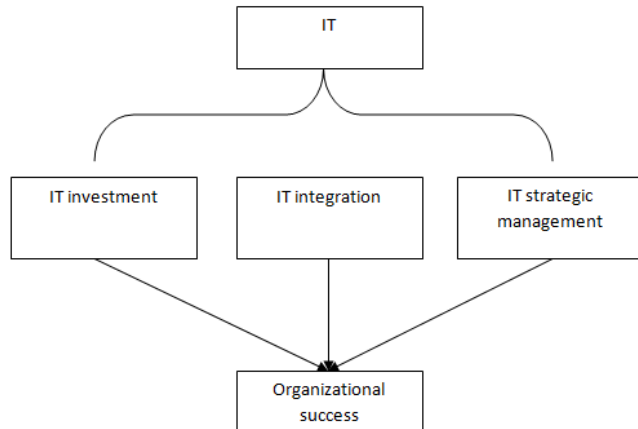
Data analysis method

At the present study, obtained data would be analyzed using inferential statistics. Firstly, central and distribution indices would be calculated such as mean value and SD for each item of questionnaire and then, to assess correlation between variables, Spearman test has been applied. Finally, collected data would be analyzed using SPSS software.

Results

Descriptive statistics

In this section, descriptive statistics and relevant tables of sample information would be presented.

Table 2: frequency distribution based on gender

Variables categories	Frequency	Frequency percent	Valid percent	Mode
Male	227	59.1%	59.1%	1
Female	157	40.9%	40.9%	
Total	384	100%	100%	

Table 3: frequency distribution based on age

Variable categories	Frequency	Frequency percent	Valid percent	Mean
Below 35 year old	114	29.7%	29.7%	42.7
35-45 years old	151	39.3%	39.3%	
45-55 year old	54	14.1%	14.1%	
Above 55 year old	65	16.9%	16.9%	
Total	152	100%	100%	

Table 4: Frequency distribution based on work experience

Variable categories	Frequency	Frequency percent	Valid percent	Median
Below 5 years	72	18.8%	18.8%	2
5-10 years	153	39.8%	39.8%	
10-15 years	102	26.6%	26.6%	
15-20 years	36	9.4%	9.4%	
Above 20 years	21	5.5%	5.5&	
Total	384	100%	100%	

Table 5: mean value and standard deviation of indices of components of integration and IT investment indices

Indices		Number	Mean	SD
Integration	Information systems	384	3.43	0.734
	Database	384	3.47	0.681
	Communication infrastructures	384	3.56	0.642
Investment	Infrastructural investment	384	3.61	0.627
	Investment on education	384	2.67	0.830
	Investment on customer use	384	3.53	0.680
	Investment on developing database	384	3.64	0.784

Table 6: mean value and SD of organizational success components

Indices		Number	Mena	SD
Flexibility	Flexibility n supplying services to customers	384	3.57	0.757
	Flexibility of employees	384	3.62	0.723
Integration	Sharing tasks and specialization	384	3.58	0.706
	Ability to cooperate with others	384	2.67	0.871
Acceleration	Acceleration in supplying services to customers	384	4.18	0.535
	Acceleration in in-organization communications	384	4.08	0.618
Innovation	Innovation in manner of supplying services	384	4.02	0.637
	Innovation in supplying new services	384	4.00	0.584

Inferential statistics: testing research hypotheses

Data distribution assessment

Firstly,to measure normality of data distribution, Kolmogorov-Smirnov test has been applied. If significance level is more than error probability level (a=0.05), desired distribution is normal. However, if significance level is less than error probability level (a=0.05), the distribution would not be normal.

Table 7: data distribution

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	K-S value	Sig	Error probability level	Result
IT integration	4.729	0.000	0.05	Abnormal
Attitude to IT investment	3.702	0.000	0.05	Abnormal
Participation	8.941	0.000	0.05	Abnormal
Competency	2.734	0.000	0.05	Abnormal
Development	3.588	0.000	0.05	Abnormal
Organizational success	2.879	0.000	0.05	Abnormal

In table 7, due to K-S value and significance level, it could be found that desired distribution has been different from observed distribution for all mentioned variables and hence, distribution of the variables is abnormal. Therefore, nonparametric tests should be applied to test research hypotheses.

Main hypothesis: there is significant correlation between IT strategic management indices and organizational success. In order to assess effect of IT strategic management components on success of organization, multivariate regression analysis should be applied. However, before conducting the regression analysis, correlation should be measured.

Table 8: correlation coefficient estimation

Strategic management indices	Organizational success	
	Kendall Tb correlation coefficient	Sig
IT integration	0.353	0.000
Attitude to IT investment	0.547	0.000
Participation	-0.179	0.000
Competency	0.511	0.000
Development	0.333	0.000

According to calculated statistics and observed error level, it could be found that firstly a two-way correlation with least confidence level of 99% is existed between IT strategic management and organizational success. Secondly, the most correlation in indices is associated with attitude to IT investment with correlation coefficient of 0.547. Therefore, nonparametric multivariate regression analysis can be applied.

Table 9: input and output variables

Model	Input variables	Output variables	Regression
First	Above independent variables	-	Categorical data

Table 10: regression model summary estimation

Row	Model	Multivariate regression coefficient	Determinant coefficient	Adjusted determinant coefficient
1	First	0.774	0.599	0.590

Table 10 has presented the relationship between IT strategic management indices (IT integration, attitude to IT investment, participation, competency and development) and variable of organizational success. In this table, multivariate regression coefficient of independent variables with organizational success is equal to 0.774. Determinant coefficient of independent variables is about 0.60 and adjusted determinant coefficient based on Df of variables is equal to 0.59. In other words, variation amount of organizational success variable based on effects of mentioned variables is equal to 0.60, which is equal to 0.59 with exact estimation of df of each variable. Hence, 59% of variations of organizational success would be determined and predicted by the mentioned variables.

Table 11: ANOVA analysis and determining model significance level

Model	Sum of squares	df	Mean squares	F value	Sig
Discriminated (regression)	230	9	25.564	62.114	0.000
Residual	153.925	374	0.412		
Total	384.000	383			

According to F value and significance level (sig<0.05), it could be found that the correlation is significant in confidence level of 99%. In other words, there is significant correlation between effective components and organizational success. Hence, H0 is rejected and alternative hypothesis is confirmed.

Table 12: regression weighted coefficients

Model factors	Std. B	F value	Sig
IT integration	-0.299	12.866	0.000
Attitude to IT investment	0.453	18.003	0.000
Participation	-0.299	10.034	0.002
Competency	0.317	5.131	0.006
Development	0.153	2.215	0.138

In table 12, weighted coefficients of each variable on dependent variable (Beta) separated for standardized, t-test, observed error or each variable with dependent variable have been presented. Accordingly and due to the standard path coefficient and F value that indicate except for development index, all factors can affect organizational success significantly, it could be found that the mentioned components are predictors of organizational success. However, the factor of attitude to IT investment with beta coefficient of 0.453 has the most predicting and significant effect on organizational success. Hence, due to these coefficients, one can firstly present regression equation of organizational success based on independent variables and constant coefficient and secondly, effect of each independent variable per a unit change in dependent variable can be also predicted.

Hypothesis 1: there is significant correlation between IT integration index and organizational success.
Structure of the hypothesis is in kind of relationship structure. In other words, the hypotheses consider correlations. Therefore, suitable test for correlation hypotheses is correlation test, for which nonparametric tests should be applied due to the abnormality of the data. In this

regard, one of the best tests can beKendall Tb correlation coefficient, since the sample size is large.

Table 13: Spearman correlation coefficient

Row	Variable	Kendall Tb correlation coefficient	p-value	Number
1	Integration of information systems and organizational success	0.219	0.000	384
2	Integration of database and organizational success	0.172	0.000	384
3	Integration of communication infrastructure and organizational success	0.394	0.000	384
4	IT integration and organizational success	0.353	0.000	384

As it is obvious, according to Kendall tb value (0.353) and p-value less than 0.01 (p-value<0.01), it could be mentioned that the correlation between mentioned variables is significant in confidence level of 0.99. In other words, H0 is rejected and alternative hypothesis is confirmed. Therefore, there is significant correlation between IT integration and organizational success.

In addition, correlation coefficient between the two variables indicates that the intensity of correlation between them is strong and has direct orientation. In other words, IT integration is in direct relationship with organizational success to 0.35. Hence it could be mentioned that the more the IT integration is, the better and more efficient organizational success would be.

Hypothesis 2: there is significant correlation between i=IT investment and organizational success.

To test the hypothesis, Kendall tb correlation coefficient has been applied.

Table 14: Spearman correlation coefficient

Row	Variable	Kendall Tb correlation coefficient	p-value	Number
1	Investment on information systems and organizational success	0.356	0.000	384
2	Investment on education and organizational success	0.245	0.000	384
3	Investment on customer use and organizational success	0.220	0.000	384
4	Investment on database development and organizational success	0.655	0.000	384
5	IT investment and organizational success	0.547	0.000	384

As it is obvious,according to Kendall tb value (0.547) and p-value less than 0.01 (p-value<0.01), it could be mentioned that the correlation between mentioned variables is significant in confidence level of 0.99. In other words, H0 is rejected and alternative hypothesis is confirmed. Therefore, there is significant correlation between IT investment and organizational success.

In addition, correlation coefficient between the two variables indicates that the intensity of correlation between them is strong and has direct orientation. In other words, IT investment is in direct relationship with organizational success to 0.55. Hence it could be mentioned that the more the IT investment is, the better and more efficient organizational success would be.

Conclusion

Over the years, IT management has been evolved increasingly and has been considered as an important and vital factor for performance of organizations. Business-driven It management (BDIM) refers to perfect adaptation of IT and business.

384 people of managers, experts and members of Oil Pension Fund have been selected as sample in this study. 59.1% of sample people are male and 40.9% are female. Considered indices for IT integration include information systems, databases and communication infrastructures. Indices for IT investment also included infrastructural investment, investment on education, investment on customer use and investment on database development.

According to the study, it was found that except for investment on education for employees, which was in weak level, all remained components at the mentioned organization are in average level. Components of organizational success also include flexibility, integration, acceleration and innovation. Investigations indicated that except for sharing tasks and specialization, which were in weak level, other remained components have been relatively in high level at the studied organization.

Obtained results from testing hypotheses indicated that IT strategic management and organizational success have significant correlation. In addition, IT integration index and investment are in significant correlation with organizational success.

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