



**International Journal of Biology, Pharmacy
and Allied Sciences (IJBPAS)**

'A Bridge Between Laboratory and Reader'

www.ijbpas.com

**A STUDY ON THE FACTORS AFFECTING HUMAN RESOURCE INFORMATION
SECURITY BASED ON CLARK'S MODEL AND ITS STRATEGIES OF
IMPROVEMENT IN THE TELECOMMUNICATION ORGANIZATION
OF CHAHARMAHAL-O-BAKHTIARY PROVINCE (IRAN)**

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ABSTRACT

The present paper studies factors that affect the security of human resource information systems based on Clark's model and its strategies of improvement in the telecommunication company of Chahar Mahal-o-Bakhtiary province. The survey-descriptive method in the field study has been applied. The statistical population of the research consists of 140 formal employees of the administration of the telecommunication organization of Chahar Mahal-o-Bakhtiary province. The information analyzed via SPSS and LISREL by using descriptive and inferential statistics. The results of linear regression analysis shows that 95 percent of the human resource information security is predicted by Clark's different indicators and the most important effectiveness belongs to the variables of policies, and then rules. Moreover, architecture, integration, training, risk analysis, and information evaluation affect the security of human resource information system.

**Keywords: Information Security System, Clark's Model, Communication Organization,
Human Resource Information System**

INTRODUCTION

The protection of information systems of the organization is one of the important elements for the survival of organization. Today, the information is considered as the asset for an organization, while the protection of information and information systems is one of the important elements for the organizational survival. The economic globalization has caused global competition and many of the organizations have to cooperate with other organizations in order to be present in the global position. Therefore, classification and valuation of information is vital for the information systems and members of the organization [1, 2].

Human Resource Information System

Determining the human resource information system is the first and most important step to take in order to reach successful management of human resource. Malcolm Benninson believes that the information is the strategic key for human resource planning. The presence of human resource, and its supply and demand in the future could be determined by human resource information system. It should be noticed that the target of human resource information systems is not to plan for the organization; in fact, it helps the organization and its management to plan for the human resource. There are some

definitions for information systems and some of them are presented as follows [3]:

The human resource information system refers to an organized method of collecting, maintaining, and presenting information to managers in order to make decisions on four areas of human resource management. Human resource information system is a combination of databases, computer applications, and the required hardware and software for collecting, saving, managing, transferring, presenting, and modifying data for human resource. The system has been developed in 1960s [4].

Human resource information is a kind of functional database which is designed for maintaining data in relation to the employees and supporting activities of human resource areas consisting of recruitment, selection, and training. The data maintained in human resource information system is important because the human resource of an organization is the greatest asset of the organization; moreover, the ability to apply this asset in a flexible way is the key for the organization to reach competitive advantage [5]. Today, long-term human resource planning has been replaced with short-term allocation and management of human resource for meeting instant needs. Since individuals vastly change their working place

from one organization to another one, and they make short-term contracts, some concerns have emerged in the realm of human resource. The problem could only be solved by applying a human resource information system which has the capability of finding quick access to the current information in relation to individuals and their skills [6].

Human Resource Information Security

Today, the development of IT applications has increased the importance of confronting security threats. Using computer networks for sharing important information among different geographical areas has many advantages; however, it has paved the way for more abuses⁷. Therefore, one of the important issues in the field of information technology refers to the information technology security. Information technology consists of technologies which are at the service of saving, processing, transferring, and managing information. However, information technology refers to the safe use of the technology and an environment devoid of threads. Information technology could be studied in two important parts of computer security and communications security.

Information Security Management

Information security management is part of information management and it determines goals of security, studies barriers to achieving

goals, and presents the needed strategies. Moreover, security management is supposed to implement and control the performance of the security system of the organization. It also needs to keep the system up-to-date permanently. The goal of information security management in an organization is to keep assets (software, hardware, information, communication, and human resource) of an organization far from threads (having no allowed access to information, and system and environmental risks caused by users). To achieve this purpose, a comprehensive plan is needed. Moreover, information security system is a strategy to reach the purpose.

The assessment of human resource information security based on Clark's model

In the field of information security, there are few studies that have tested models experimentally and have applied limitations and structures associated with human factors and behaviors and/or managerial and structural components. The mentioned studies have usually ignored humans' behaviors, while they have considered the behavioral results [10 &11]. Many of the scientists and experts of the information security have emphasized lack of serious experimental research studies in this field.

In Iran, nobody is aware of his current situation. Today, home users and private companies are not supposed to be aware of information security, but the problem is that even the governmental organizations have the least awareness of the systems security and information resources. Training and informing users is one of the fundamental issues related to security plans. Unfortunately, there is no place for security plans in the governmental organizations. Regarding the increasing importance of human factors in the information and security systems, the need for performing a comprehensive plan is felt [12]. Therefore, the present paper studies factors that affect the human resource information security based on Clark's model and presentation of its strategies of improvement. Generally, Clark et al. (2009) assumed that there is no complete security; however, the systems could reach it to some extent via the integration of security principles through the growth process of the system. This is a key point because the analysts and planners avoid security issues when there are security problems. Research studies associated with the human resource information systems show that the successful performance results from a comprehensive plan [13, 14]. Moreover, a comprehensive plan considerably affects the effectiveness of the system [15]. A human

resource information system might be less attractive than the traditional human resource systems; therefore, it is less likely to draw people's attentions to itself [16]. Although Clark's model does not concentrate on human resource problems, it could include them as well. Clark's model reflects life cycle of the growth system of national institute of standard and technology. Totally, assessment of information, policies, rules, architecture, integration, training, and risk analysis are the factors that affect human resource information security.

Research Background

In his study, Bahrami, 2011, presented a proper method for improving and developing information security management indices in order to plan and perform it in the organizations. The results showed that without considering unpredictable causes, security could safely and effectively exceed 95 percent in the next decades [17].

In another study, Hashemifar, 2010, designed a human resource information system, studied the fundamental functional considerations for providing human resource information system, investigated software and hardware characteristics of the system, and pointed to the most important advantages of the system [18].

Nasirzadeh Vanhari and Saadatnia, 2010, worked on a comparative study between human resource information system and electronic human resource management. The research studied human resource information, and then it suggested the electronic human resource management to the Fara-Tahqiq-e-Sepahan company via performing the mentioned system. In this way, a small step was taken to reach the future goals and plans of development [19].

Elahi *et al.*, 2009, worked on a research titled as “presenting a framework for human factors associated with information systems”. The research intended to identify and model vital managerial structures that affect the effectiveness of information system security. Therefore, support structures of supreme management, security training, security culture, security skills, the enhancement of security policy, and individuals’ beliefs and experiences were introduced as the factors that affect the effectiveness of information systems security. Finally, the final model of the research titled as “the model of effective human resources on information systems security” was presented [20].

Jabarzadeh and Kokabi, 2009, studied one of the information systems known as human resource information system. Such information systems apply databases

associated with human resource of the organization in order to provide the required information for managers’ decision-making at different levels. Moreover, the study explained the necessity of using this type of system, its nature, its structure, and its application [21].

Ayati and Mohamadzadeh, 2009, studied human security and the application of new information and communication technologies. In this research, different aspects of security at different levels were identified and defined, how human security was disturbed by new technologies and developments was studied, and also different strategies for confronting security threats from different aspects were presented [22].

Mahmoudzadeh and Rajabi, 2006, studied security management in information systems. The results of the research showed that users’ unawareness was the first threat and human resource security was the second threat for the security of computer systems information. The components of physical security and information security were respectively the third and fourth threats [23].

In his study titled as “the guide for implementing information management system”, Khaleqi (2004) declared that the organization personnel’s awareness of rights, duties, responsibilities, and responding in the

program of security of organization's network played an important role in providing security of the network and its stability. A considerable part of the security policies of the organizational network was allocated to the determination of personnel for supplying the security of the system. Moreover, the administrative processes should be predicted for the plans of security of the organization network. Furthermore, the team of network security of the organization should have the knowledge of network security in order to be able to support organization network and provide the predicted security goals [24].

In his study titled as "information security, the fourth wave", Basie (2006) studied the four waves of information security. The first wave was the technical wave. The second wave showed that information security had a strong managerial aspect. The third wave emphasized the need for having a kind of standardization of information in the company, having the best managerial practices, emphasizing a proper culture for information security, and measuring and observing the information security. The fourth wave was related to the development of certain role of providing information security [25]. Knapp *et al.*, 2004, [26] provided a new pattern for information security and it was

considered as a human issue and an organizational issue.

In a study titled as "how to make effective information security policy", Honn and Eloff, 2003, concluded that majority of the users were unaware of information policies or they did not perceive them thoroughly. They believed that policies were too long or too technical; moreover, the users did not understand the relation between their daily duties and information security policy. Consequently, they did not follow it. The purpose was to understand the significance of information security policy for establishing information management system, and also to know how to provide it to achieve security goals as well as the most profit of users' general partnership [27].

METHODOLOGY

The survey-descriptive method in the field study has been applied. The statistical population of the research consists of 140 formal employees of the administration of the telecommunication organization of Chahar Mahal-o-Bakhtiary province. Since the statistical population has a small scale, the census method is used to determine the sample size. To do so, 140 questionnaires have been distributed; 120 questionnaires (86 percent) have successfully collected. The information analyzed via SPSS and LISREL

by using descriptive and inferential statistics. The researcher-made questionnaire is also used to measure the research study. Since there is the total number of 140 employees, there is no need to determine the statistical sample and the whole statistical population should be studied. Therefore, the sampling method of census has been applied and the questionnaires have been distributed to all of considered employees. 120 questionnaires out of 140 were completely filled and the rest of them were omitted from the study. Since the number of collected questionnaires has exceeded 75 percent of the total statistical population, the present paper is completely acceptable regarding the sample number of the study.

After completing the questionnaires, SPSS is used to enter information into the computer and also to analyze it. In the present paper, the content-dependent validity has been used. In order to determine content validity of the research, the researcher has taken advantage of the experts' and professors' and supervisors' knowledge of management. Moreover, Cronbach's alpha, and the 30 questionnaires are used to determine the reliability of the research. The research analysis is also done at two levels of descriptive statistics and inferential statistics. At the level of descriptive statistics, statistical

indices of frequency, percentage, mean, and so forth have been applied. Moreover, at the level of inferential statistics, regarding the level of assessment of data and statistical hypotheses, Pearson correlation coefficient has been applied to study the relation between two continuous variables.

RESULTS

Test of Research Hypotheses

The primary hypothesis

H₀: different factors of Clark's model do not affect the human resource information security.

H₁: different factors of Clark's model affect the human resource information security.

In order to test the hypothesis, linear regression is used.

According to **Table 1**, the hypothesis is confirmed regarding regression coefficient of 0.97. Moreover, coefficient of determination of 0.95 shows that 95 percent of the human resource information security is predictable based on different indicators of Clark's model.

According to **Table 2**, the value of test statistic and level of significance ($p < 0.5$) show that the test is significant.

According to **Table 3**, the maximum effect of the independent variables is related to policies. 1 unit of change in the independent variable causes 1.04 units in the dependent

variable or the information security. The next factor is rules that affect the dependent variable up to 0.5 percent. However, other factors are not considerably effective. Therefore, the primary hypothesis of the research is confirmed.

The secondary hypothesis (1)

H0: it seems that policies do not affect the human resource information security

H1; it seems that policies affect the human resource information security

According to **Table 4**, the correlation coefficient ($r=0.97$) and level of significance ($p=0.000$) show that policies affect the human resource information security, therefore the research hypothesis is confirmed ($P < 0.05$).

The secondary hypothesis (2)

H0: it seems that rules do not affect the human resource information security

H1; it seems that rules affect the human resource information security

According to **Table 5**, the correlation coefficient ($r=0.53$) and level of significance ($p=0.000$) show that rules affect the human resource information security, therefore the research hypothesis is confirmed ($P < 0.05$).

The secondary hypothesis (3)

H0: it seems that architecture does not affect the human resource information security

H1; it seems that architecture affects the human resource information security.

According to **Table 6**, the correlation coefficient ($r=0.57$) and level of significance ($p=0.000$) show that architecture affects the human resource information security, therefore the research hypothesis is confirmed ($P < 0.05$).

The secondary hypothesis (4)

H0: it seems that integration does not affect the human resource information security

H1; it seems that integration affects the human resource information security

According to **Table 7**, the correlation coefficient ($r=0.42$) and level of significance ($p=0.000$) show that integration affects the human resource information security, therefore the research hypothesis is confirmed ($P < 0.05$).

The secondary hypothesis (5)

H0: it seems that training does not affect the human resource information security

H1; it seems that training affects the human resource information security

According to **Table 8**, the correlation coefficient ($r=0.34$) and level of significance ($p=0.000$) show that training affects the human resource information security, therefore the research hypothesis is confirmed ($P < 0.05$).

The secondary hypothesis (6)

H0: it seems that risk analysis does not affect the human resource information security

H1; it seems that risk analysis affects the human resource information security

According to **Table 9**, the correlation coefficient ($r=0.33$) and level of significance ($p=0.000$) show that risk analysis affects the human resource information security, therefore the research hypothesis is confirmed ($P < 0.05$).

The secondary hypothesis (7)

H0: it seems that assessment of information does not affect the human resource information security

H1; it seems that assessment of information affects the human resource information security

According to **Table 10**, the correlation coefficient ($r=0.41$) and level of significance ($p=0.000$) show that assessment of information affects the human resource information security, therefore the research hypothesis is confirmed ($P < 0.05$).

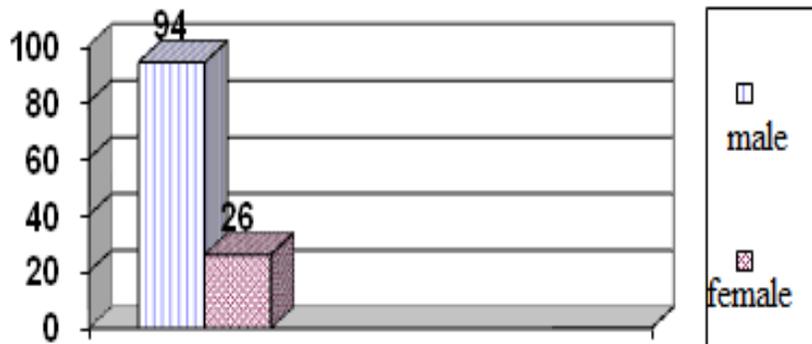


Figure 1: Frequency Distribution of Employees Based on Sex

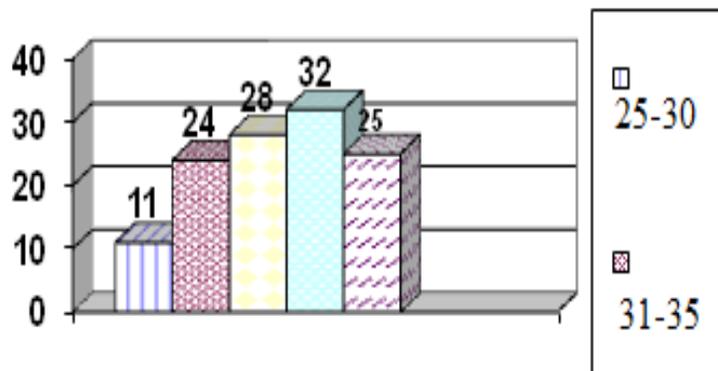


Figure 2: Frequency Distribution of Employees Based on Age

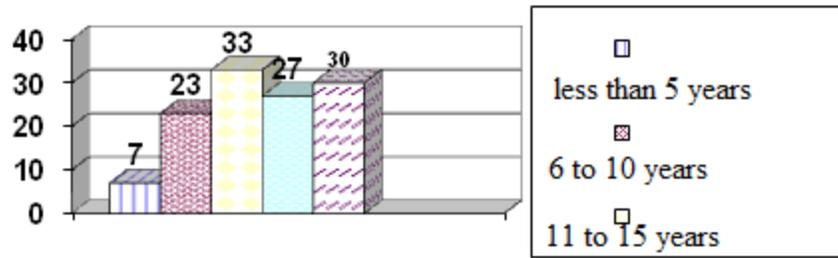


Figure 3: Frequency Distribution of Employees Based on Job Experience

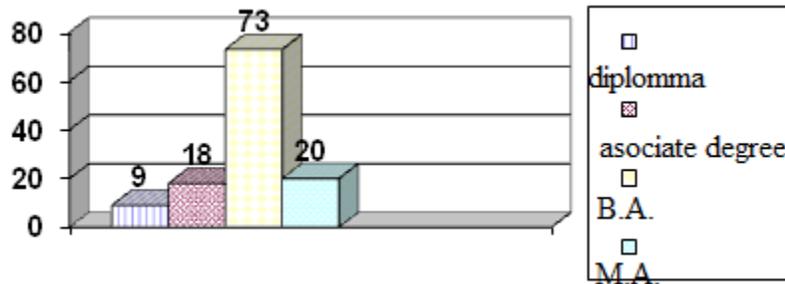


Figure 4: Frequency Distribution Based on Education

Table 1: Regression Test

Durbin-Watson statistic	Statistical changes					Standard error	The square of balanced regression coefficient	Square of regression coefficient	Regression coefficient
	Level of significance	Degree of freedom 2	Degree of freedom 1	Statistical changes of the test	Changes of regression coefficient				
1.63	.000	112	7	296.034	.949	.12614	.946	.949	.974

Table 2: ANOVA Test

Level of significance	Test statistic	Mean of squares	Degree of freedom	Sum of squares	Resources	Variable
□ □ □ □ □	□ □ □ □ □ □	□ □ □ □ □	□	□ □ □ □ □ □	Inter-groups	Human resource information security
		□ □ □ □ □	□ □ □	□ □ □ □ □ □	Intra-groups	
			□ □ □	□ □ □ □ □ □	Total	

Table 3: Test Coefficients

Level of significance	Test statistic	Standard coefficients	Non-standard coefficients		Model
		Beta coefficient	Standard error	B coefficient	
.097	-1.674		.124	-.208	Fixed
.000	33.983	.958	.031	1.042	Policy
.046	2.020	.054	.023	.047	Rules
.691	-.399	-.013	.032	-.013	Architecture
.154	-1.435	-.040	.032	-.046	Integration
.016	2.450	.069	.025	.062	training
.827	-.219	-.006	.028	-.006	Risk analysis
.558	-.588	-.019	.031	-.018	Assessment of information

Table 4: Test of Pearson Correlation Coefficient Test

Information security		Variable
Level of significance	Correlation coefficient	
0/000	0/97	Policies

Table 5: Test of Pearson Correlation Coefficient Test

Information security		Variable
Level of significance	Correlation coefficient	
0/000	0/53	rules

Table 6: Test of Pearson Correlation Coefficient Test

Information security		Variable
Level of significance	Correlation coefficient	
0/000	0/57	architecture

Table 7: Test of Pearson Correlation Coefficient Test

Information security		Variable
Level of significance	Correlation coefficient	
0/000	0/42	integration

Table 8: test of Pearson Correlation Coefficient Test

Information security		Variable
Level of significance	Correlation coefficient	
0/000	0/34	Training

Table 9: Test of Pearson Correlation Coefficient Test

Information security		Variable
Level of significance	Correlation coefficient	
0/000	0/33	Risk analysis

Table 10: Test of Pearson Correlation Coefficient Test

Information security		Variable
Level of significance	Correlation coefficient	
0/000	0/41	Assessment of information

DISCUSSION AND RESULTS

The result of testing the hypothesis via linear regression shows that the hypothesis is confirmed at 0.97 of regression coefficient. The coefficient of determination 0.95 shows that human resource information security is predicted by Clark's different indicators. In this model, the most effectiveness of the independent variables is related to policies. In this case, 1 unit of change in the independent variable causes 1.04 unit of change in the dependent variable or information system security. The next effectiveness belongs to the variable of rules which affects the dependent variable up to 0.5 percent; however, other factors do not considerably affect the dependent variable.

In his study, Bahrami, 2011, presented a proper method to improve and develop indicators of information security management in order to plan and implement it in the organizations. The achieved results showed that without considering unpredictable causes, the security could safely and effectively exceed 95 percent in the next decades. The present paper has also reached the same conclusion. Hone and Eloff, 2003, presented a research titled as "what makes an effective information security policy?". They believed that many of the users were not aware of information policies or they did not

perceive it completely. They believed that policies were too long or too technical and the users could not understand the relation between their daily' tasks and the information security policy and it causes annoyance. The results of the present paper were in accordance with the results of Bahrami's study as well as Hone and Eloff's study and they confirmed the achieved results.

In his study titled as "the guide for implementing information management system", Khaleqi, 2004, declared that the organization personnel's awareness of rights, duties, responsibilities, and responding in the program of security of organization's network played an important role in providing security of the network and its stability. A considerable part of the security policies of the organizational network was allocated to the determination of personnel for supplying the security of the system. Moreover, the administrative processes should be predicted for the plans of security of the organization network. Furthermore, the team of network security of the organization should have the knowledge of network security in order to be able to support organization network and provide the predicted security goals. The results of the secondary hypotheses of the present paper were in accordance with the results of Khaleqi's study.

CONCLUSION

The results of testing the primary hypotheses of the research showed that 95 percent of human resource information security could be predicted by Clark's different indicators.

Moreover, the results of testing the secondary hypotheses of the research indicated the following issues:

- Policies affect the human resource information security. The more the effectiveness of policies, the more the human resource information security in the office and vice versa ($p < 0.05$).
- The rules affect human resource information security. The more the effectiveness of rules, the more the human resource information security in the office and vice versa ($p < 0.05$). Therefore, making accurate rules could be very effective for providing the network information security.
- The architecture affects human resource information security. The more the effectiveness of architecture, the more the human resource information security in the office and vice versa ($p < 0.05$). Therefore, architecture affects the human resource information security.

- The integration affects human resource information security ($p < 0.05$).
- The training affects human resource information security. The more the effectiveness of training, the more the human resource information security in the office and vice versa ($p < 0.05$). Therefore, the hypothesis is confirmed.
- The risk analysis affects human resource information security. The more the effectiveness of the risk analysis, the more the human resource information security in the office and vice versa ($p < 0.05$). Therefore, the hypothesis is confirmed.
- The assessment of information affects human resource information security. The more the effectiveness of assessment of information, the more the human resource information security in the office and vice versa ($p < 0.05$).

SUGGESTIONS

According to the findings of the research, the practical suggestions and strategies for improving factors that affect the human resource information security will be presented as follows:

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- a) Considering the result of testing the primary hypothesis of the research, policies have the most effect on the human resource information security. If the users are unaware of the information policies or they do not perceive them truly, the managers should try to improve the employees' information level.
- b) According to the first secondary hypothesis of the research, policies affect the human resource information security. Therefore, managers should provide the needed training on order to maintain the security of information.
- c) Since the second secondary hypothesis of the research shows that rules affect the human resource information security, the managers should provide the rules so that the users could use them for maintaining the information system security.
- d) According to the third secondary hypothesis, the integration affects human resource information security. Therefore, the employees attempt to adapt themselves with the organization by using factors related to the organizational environment.
- e) Since the training affects human resource information security, the managers should try to meet employees' training needs.
- f) Since the risk analysis affects the human resource information security, the managers should optimize employees' performance by presenting a proper analysis of risk.
- g) According to the seventh secondary hypothesis, the assessment of information affects the human resource information security. Therefore, the managers should provide the necessities to have a correct assessment of information.

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