The Role of Cyberspace Variables on Development of Cyber-Crime in Iran

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Abstract

The main purpose of this paper is to study the relationship between the important variables of cyberspace and cyber-crime in Iran. In order to assess this relationship, a model with 9 latent variables has been presented, where each of the variables is measured by some other indicators. In order to measure the indicators, a questionnaire was prepared and distributed among 79 respondents. The visual PLS was employed to estimate the relationship between the latent variables. According to the results, there is a significant relationship between learning, permanent accessibility, ultra-time, fluidity, augmented reality, multimedia factor and cyber-crime in Iran.

Keywords: Variables of Cyberspace, Cyber-Crime, PLS Path Modeling

Introduction

Information and communication technology has been obtained from the convergence and combination of three different technological trends in three fields of information, communication, and computer services (Jalali, 2009: 56). In one hand, during the recent years, ICT has had the highest impact on the human life in various aspects, which can be regarded as a large technological and great scientific innovation. In addition, it has had a considerable and undeniable effect on executive processes of governmental and private organizations around the world and as a global phenomenon, has affected the whole decision-making process and it has been turned into a critical tool for management. It has been converted to a strategic concept in many countries and engaged in the heart of development. On the other hand, the complexity of technologies and new changing trends, which have been resulted from the evolution of communities. Human communications have become more complex in the international community and emerged specifically in each cultural and social field. It is unlikely to understand and recognize these growing complexities without a continual study of the changes of the society and technology and realizing the promotions of an interdisciplinary attitude towards them. The expansion and development of various applications of ICT in different fields can be performed using some tools, which have been formed, according to the advanced technologies in computers, softwares, and communication equipment such as internet and telecommunication tools. Information and electronic communication systems have brought the entire world into a network (*Castells*, 2010). The new emerging social structures in different fields of human activities, and the dominant functions and processes have been organized more than ever in the networks in the information era. Cyberspace has penetrated its effective role in various areas of human activities and changed the game rule in the entire areas. In particular, in the field of crimes, it has introduced serious threats to the society and politics, which can be regarded as the most important social product of the modern technologies with its accelerating alterations. The existing problem is that whether the new information and communication technologies and the related trend act similar to traditional tools to create environmental opportunities and threats or it should be considered as a unique phenomenon. In this regard, the most important role, which distinguishes the

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role of modern instruments from other previous ones is the numerous changing capabilities and capacities that these instruments provide for all people and particularly criminal organizations. This new atmosphere has been already emerged and is associated with its special characteristics such as the global domain, integration of all mass media, the potential interaction, high accuracy, high speed, storage of high volume of information, indefatigability, the rapid exchange of information, easy access, and other effective super variables. It is changing many essential components relating to the personal and social life, including the nature of crime threats in cyberspace. The main goal of this research is to study this important subject. In the next section, this subject is investigated by reviewing the theoretical fundamentals of cyberspace in addition to its changing trends, and the crime in cyberspace as well as the resulting threats, and the relationship between these two.

Literature Review

Space is a concept that should be precisely considered in a special way and should not be regarded equal to physical location. In fact, space should be regarded as a combination of time, space, human relations, meaning, and place (Reymers, 1998). Some people regard the space as an independent variable with major influences on social processes (Afroogh, 1998). Although it is not easy to accept this view, it cannot be also denied that space is a social construct (Reymers, 1998) and social relations are relied in the space. In other words, it can be stated that the society is structured spatially and the spatial structure of the society directly affects the performance in the society (Afroogh, 1998). Therefore, one should know that space is not a photocopy of society, but it is the society itself (*Castells*, 2010).

In addition, the social issues around this new space have been affected. Some super variables include acceleration of space, learning, permanent accessibility, ultra—space and ultra-time, fluidity, augmented reality, and multimedia factor. This space is the space of speed and traveling in physical spaces gives people the opportunity to choose and adopt new conditions, which is impossible in virtual spaces. Social interactions in general as well as social and cultural damages in particular are affected by these super variables, which are the inherent phenomena in this space. The damages and threats of this space are rapid and transient. The distance between being healthy or damaged can be only a single click. In learning, it is required to pay sufficient attention to the specifications of the boundless scope of hardware and software communication networks in cyberspace.

It could help us to acquire the limitless scope in human and social communication networks on the web and internet. These extensive networks in cyberspace can create broad phenomena in this space in different levels. In ultra-space and ultra-time, it should be expressed that this space cannot be measured as a location in the physical space from the topological point of view (Ameli, 2011). By expanding the capacity of the place to the space and distinguishing between the slow and rapid time and in other words, "concurrent transfer", a serious difference can be easily confirmed between the physical space damage and cyberspace damage. The augmented reality refers to the effect of inherent characteristics of cyberspace on different phenomena, people, and the interactions inside this space (Zaleski, 1997). In the book of "spirit of cyberspace", the author believes that cyberspace transfers different realities. The reality in physical spaces has a special harmony and persistence that has changed the physical space coordinates in cyberspace by reproducing this reality in concrete and objective categories.

In real space, analogue case is an object—oriented case, which causes all the changes. Digital case in cyberspace is numerical and is evaluated by the zero and one logic. The analogue change logic is object-oriented and the physical and digital change logic is the capacities of numbers. Digital and analogue changes are categorized in software and hardware classes, respectively. Digital change is subject to mathematical rules and analogue change is subject to natural rules. The characteristics of digital case include manipulability, networking, compressibility, and contraction. The combination in analogue phenomenon is subject to physical and object-oriented rules, but the combination in digital case is subject to mathematical rules. Therefore, analogue combinations are finite and digital combinations are infinite and according to this, the virtual damages are segmented as digital damages, which are limitless, tend to infinity, and are being rapidly developed in two-space world. The digital damage is a nonlinear damage, which is difficult to control. Digitalization of damages causes rapid change and conversion, widespread density, and concretization of many corruptions (Ameli, 2011).

Permanent access is another super variable of cyberspace. From technological point of view, cyberspace is an approved space. Lack of barriers in temporal and spatial physical space has provided a new criterion for accessibility. Globalization is a super variable, which is an inherent part of this space, as it is borderless, ultra-spatial and ultra—temporal and all these features have made this space a global space. Global and local processes have been fused

with each other in this new space. The distance between an individual and another is only a click. Fluidity is one of the potential super variables of cyberspace, which is the function of equipment and tools in this space. This space is the space of rapid, local, global, ultra-spatial and ultra-temporal movement. Not only people can travel in cyberspace, but also the information flow has high fluidity. The high power of movement allows a person to flow easily in the space. For instance, if someone is located in Iran at any time, he can be another country with one more click. Augmented reality refers to the effect of the inherent characteristics of cyberspace on the phenomena, people, and the interactions in this space (Zaleski, 1997). As claimed in the book of "spirit of cyberspace", it is believed that a sharp cyberspace can transfer different realities. The reality in physical space has a special harmony and persistence, which has altered the physical space coordinates in cyberspace by reproducing this reality in concrete and objective levels. This reproduced reality is still a reality but has a higher speed, intensity, and power with physical space logic when confronting with people. Multimedia factor is one of the most important super variables in the new media space. The multimedia factor of this space remarkably increases the effectiveness and intensity of involvement. The high effectiveness of this space is due to the involvement of most human senses when interacting with this space as a human and this has made it a chief part of this space. Two-space world has influenced on the entire life affairs. Social issues in addition to social and cultural normative structures are two-spaced and are being two-spaced in some other cases. Two-spaced social world requires us to identify the values and norms of this new space through recognizing the space and cyberspace and particularly two-space world. On the other hand, we will deal with typology and find the roots and finally explain abnormalities, damages, and consequently, the threats of crimes in two-spaced world. Furthermore, we will present the strategies for human ethnology, norms, and confrontation with social and cultural abnormalities, and the potential threats in cyberspace (Ameli, 2011).

Methodology

In the questionnaire, the importance of each item was defined according to a 1 to 5 scale in which, 1 means the minimum importance and 5 reflects the maximum importance.

This model is a causal model that includes 9 latent variables.

In order to evaluate the model, firstly, after extracting the answers (with 1-5 scale), the manifest variables should be normalized by using the following formula:

$$y_i = 100(x_i-1)/4$$

Through this formula, the scale of manifest variables changes to 0-100.

The relations between latent variables: The causality model described in figure 1 leads to linear equations relating the latent variables (structural equation modeling):

$$Z_j = \beta_{j0} + \sum_i \beta_{ji} Z_i + \varepsilon_j$$
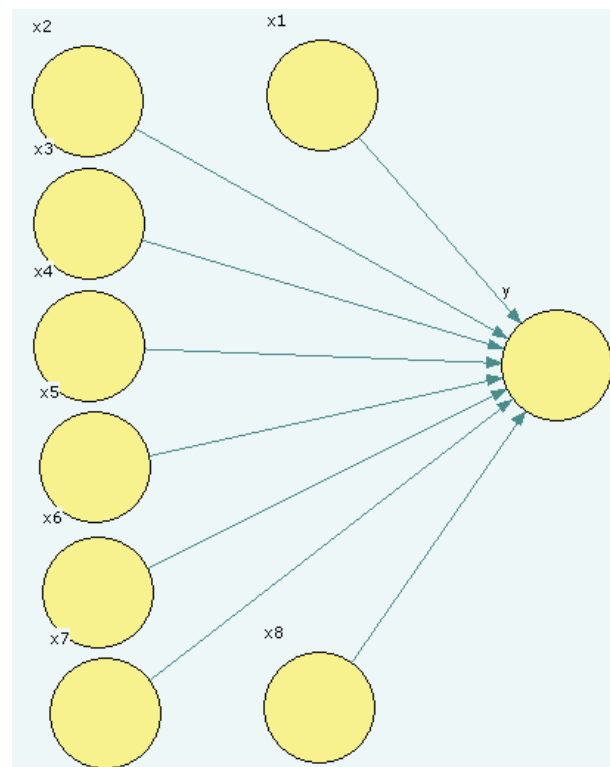
Figure 1. The research model

According to the model, the hypotheses of the research have been defined as provided below:

• There is a significant relationship between the cyberspace acceleration of space (x_1) and the development of cyber-crime in Iran.

• There is a significant relationship between the cyberspace learning (x_2) and the development of cyber-crime in Iran.

• There is a significant relationship between the cyberspace permanent accessibility (x_3) and the development of cyber-crime in Iran.

• There is a significant relationship between the cyberspace ultra—space (x_4) and the development of cyber-crime in Iran.

• There is a significant relationship between the cyberspace ultra-time (x_5) and the development of cyber-crime in Iran.

• There is a significant relationship between the cyberspace fluidity (x_6) and the development of cyber-crime in Iran.

• There is a significant relationship between the cyberspace augmented reality (x_7) and the development of cyber-crime in Iran.

• There is a significant relationship between the cyberspace multimedia factor (x_8) and the development of cyber-crime in Iran.

Having specified the relationship between different variables, the entire coefficients and parameters of the models were estimated using visual PLS software.
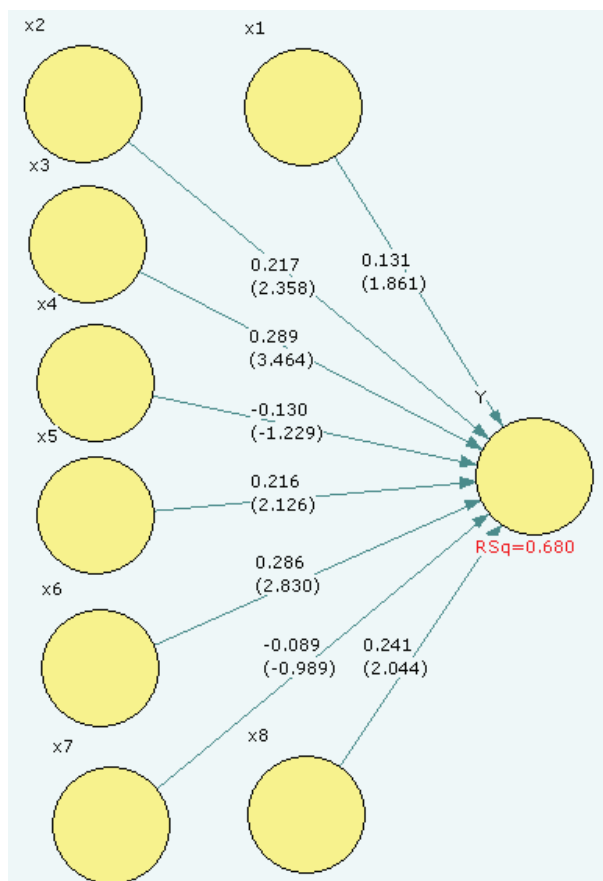

Figure 2. The estimated model using VPLS

Results

It is known that a PLS path model consists of a structural model and a measurement model. Therefore, the validation of a PLS path model requires the analysis

and interpretation of both the structural and the measurement model. This validation can be considered as a two-stage process: the assessment of the measurement model and the assessment of the structural model (Henseler, J.; Ringle, C.M.; Sinkovics, R.R.; 2009).

Assessment of the Structural Model

R^2 was used to assess the structural model and indicate the variance of endogenous latent variables. In this model, $R^2=0.68$ is acceptable, because in a model with endogenous and exogenous latent variables, the R^2 values between 0.33—0.67 is acceptable (Trujillo, 2009).

Assessment of the Measurement Models

In order to assess the measurement model, the following items should be investigated, including "unidimensionality of the indicators", "checking whether the indicators are explained well by its latent variable" and "assessing the degree to which a given construct is different from the others" (Jafari Samimi and Mohammadi, 2011).

Unidimensionality of the indicators

In this paper, unidimensionality of the indicators was measured using Cronbach's alpha. Cronbach's alpha was used in this section in order to assess the unidimensionality of the indicators. According to Hensler *et al.* (2009), the reliability of the model is acceptable because the average of Cronbach's α coefficients of the model is higher than 0.7.

Check whether the indicators are explained well by its latent variable

In order to check whether the indicators are explained well by its latent variable, three tools (including communality, composite reliability, and average variance extracted) were used:

(a) Communality

Communality is calculated with the purpose to check whether the indicators in a block are explained well by its latent variable (Trujillo, 2009). In this research, the mean communality of the model was estimated 0.62, which is the average of the entire block communalities.

(b) CR

In PLS path modeling, the reliability is examined by composite reliability (CR). In this model, average of CR is 0.84 (more than 0.6), which illustrates the acceptable reliability of the model.

(c) AVE

The average variance extracted (AVE) attempts to measure the amount of variance that a latent vari-

able captures from its indicators in relation to the variance due to measurement errors.

The average variance extracted of this model is 0.59, which is more than 0.5. This means that the model's convergent validity can be confirmed.

Difference in constructs

This part can be done by verifying that the shared variance between a construct and its indicators is larger than the shared variance with other constructs (Henseler, J.; Ringle, C.M.; Sinkovics, R.R.; 2009). According to the result obtained from VPLS software, the entire constructs are different from the others.

Research hypotheses examining

The result of structural model indicates that t-statistics of five relationships are meaningful:

Table 1- Cronbach Alpha, Reliability, and AVE

Construct	Composite Reliability	AVE	Cronbach Alpha
X1	0.81	0.6	0.67
X2	0.72	0.49	0.50
X3	0.82	0.54	0.71
X4	0.78	0.64	0.44
X5	0.85	0.33	0.81
X6	0.83	0.33	O.78
X7	0.86	0.47	0.78
X8	0.97	0.94	0.79
Y	0.93	0.98	0.93
Average	0.84	0.59	0.70

Table 2- The structural model

Relationship	T-Statistic
X1(cyberspace acceleration of space) ------> Y(development of cyber-crime)	1.861
X2(cyberspace learning) ------> Y(development of cyber-crime)	2.358
X3(cyberspace permanent accessibility) ------> Y(development of cyber-crime)	3.464
X4(cyberspace ultra–space) ------> Y(development of cyber-crime)	-1.229
X5(cyberspace ultra-time) ------> Y(development of cyber-crime)	2.126
X6(cyberspace fluidity) ------> Y(development of cyber-crime)	2.830
X7(cyberspace augmented reality) -----> Y(development of cyber-crime)	-0.989
X8(cyberspace multimedia factor) -----> Y(development of cyber-crime)	2.044

Conclusions

Based on the results, at confidence level of 95%, there is a significant relationship between learning, permanent accessibility, ultra-time, fluidity, multimedia factor and cyber-crime in Iran. However, there is no relationship between acceleration of space, ultra–space, augmented reality and cyber-crime in Iran.

The results indicated that cyber-crime in Iran has been mostly affected by the permanent accessibility (0.289), fluidity (0.286), and multimedia factor (0.241).

Acknowledgement

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