



Investigation of the key success factors in Virtual Tourism

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Abstract

The Information and Communication Technology (ICT) has caused immense revolution in tourism industry leading to the new generation of sightseeing called "Virtual Tourism" (VT). In this way, different aspects of impact on the development of VT, introduced as the success key factors. These aspects consist of an exclusive combination of ICT and Tourism. This study reviews the existing developments related to the VT, Electronic Readiness and Virtual Tourism Collaborative Networks as well as the study of the effective components in VT from ICT perspective. The methodology of the research is practical according to the purpose and descriptive-correlation based on its data-gathering technique. Hence, the hypotheses are analyzed by Structural Equation Modeling / Path Analysis and Tests of Fit. Data is collected from some tourism enterprise managers in the city of Tehran. The results show despite recent progresses in ICT industry, VT needs much more investigations to establish in Iran. Also the results help to establish the VT easier than before.

Keywords: Virtual tourism (VT), ICT, Virtual reality (VR), Electronic readiness, Iran

Introduction

Tourism industry plays an important role in cultural, social, economic and international developments besides being profitable in each country (Haley *et al.*, 2005). Statistical data reported by World Tourism Organization (WTO) mentions the significance of tourism in rise of Gross Domestic Product regarding to this case that economy of many developed countries such as France, Spain, America and some developing countries like Malaysia and Thailand depend on their tourism industry. Therefore, it is consensus to call this industry as an invisible export.

In the present century due to the growth of knowledge level in particular for improving the quality of goods and services, many businesses have considerably transformed their organizational structure towards virtual structures (Camarinha-Matos & Afsarmanesh, 2001). These dramatic changes have had significant impact on the development of communication networks especially to provide online services globally. Tourism industry like the other businesses has experienced an important change in this decade (Buhalis & Low, 2008). To date, as for geological, financial and environmental limitations, demand for new way of tourism experience such as VT has remarkably appeared (Papson, 1981; Williams & Hobson, 1995).

By consequential advancement of ICT, VT has developed to increase people accessibility to information of tourism regions. VT is a non-physical form of tourism that emerges in 3D world to integrate computing systems and human attitudes towards virtual and unreal travel (Sussmann & Vanhegan, 2000). VT utilizes the natural attractions to those who are unable to travel physically but intend to experience different places (Huh & Singh, 2007). VT comprises a lot of advantages such as cost

reduction, easy access, knowledge improvement (for both tourists and tourism enterprises) and managing tourism sites (Cheong, 1995; Paquet & Viktor, 2005; Guttentag, 2010).

Successful implementation of VT requires specific attention to key success factors in VT development and progress. Since this research is a case-study one, the key success factors are examined in Iran with respect to the development of VT, considering ICT area that will lead to identification of the effective factors for successful implementation of VT based on electronic readiness and virtual tourism collaborative networks indicators. These factors are recognized based on the capabilities of infrastructure, tourism enterprises and networks provider virtual tourism services. Since this paper is derived from a thesis, authors decided to pose the problem in the form of article. Therefore the main questions of this study are:

What factors are in ICT area impact on the development of VT in Iran?

What is the role of Electronic Readiness on Virtual Tourism?

What is the role of Virtual Tourism Collaborative Networks in Virtual Tourism?

As the results of tendency to creation of new business opportunities (in order to reach to the further profitability) and also answer to changeable needs of customers in tourism sectors, VT emerges from behind of electronic Tourism (Adrian Palmer & Patrick McCole, 2000). Many researchers believe that there are various factors which effect on VT, but they discuss about 2 main issues: Electronic Readiness (E-Readiness) and Virtual Tourism Collaborative Networks (Barradas & Pinto-Ferreira, 2009). Karanasios (2008) argued that the first and foremost step to examine the effective factors is evaluating the e-readiness in the country. Moreover

Table.1. Indicators of the E-readiness assessment in virtual tourism (Derived from the Noori's model)

Model of Noori's (2009)	services and system readiness	Web site and Portal	Multi languages, Up to date, User friendly	Cho <i>et al.</i> (2002); Shirvani and Baneshi (2009)
		Electronic Services of Virtual Tourism	Example: Electronic payment systems, Electronic Learning,	Buhalis and Licata (2002); Shirvani and Baneshi (2009)
		Systems Integration	Up to date information with High credibility, data transmission with minimal barriers and high speed	Shanker (2008); Shirvani and Baneshi (2009)
	Infrastructure readiness	Intranet and Hardware	Easy Transformation of data among employees, Reducing some costs of networking	Mutula and Brakel (2006) Shirvani and Baneshi (2009)
		Value-added Services	Example: Theme parks, Disneyland, Video Conferences, IMAX cinema	Vlahakis (2002); Shirvani and Baneshi (2009)
		Security of information	Limited access of value chain members to the information of users, Tourism information classification	Shirvani and Baneshi (2009)
	organizational readiness	Readiness of experts and users	Familiarize managers with the advantages of ICT ICT experts The amount of tourism expertise in the use of virtual reality	Mutula and Brakel (2006) Shirvani and Baneshi (2009)
		Alignment of ICT strategies with the goals of enterprises	The Formation of virtual tourism is based on information	Alshawi (2007) Shirvani and Baneshi (2009)
		Financial and Legal Readiness	The amount of investments, rules and Policies formulated by the government and experienced managers of virtual tourism systems	Shirvani and Baneshi (2009)

Afsarmanesh, Ermilova, Msanjila and Camarinha-Matos (2009) believed that investigation into the Collaborative Networked Organizations (CNOs) is necessary in order to establish the virtual tourism enterprises as an infrastructure for implementation of VT enterprises. CNOs are form of independent organizations which gathered via the information and communication technology to share the core competencies and recourses. It is important to examine the role of CNOs due to having Virtual Tourism Collaborative Networks instead of traditional tourism interprises in Virtual Tourism system. It should be mentioned that all hypotheses about VT (in ICT context) are directed towards these variables: e-Readiness and CNOs.

Virtual Tourism via Virtual Reality Technology

Dewailly and Jean-Michel (1999) discussed that irrespective of service-based approaches, there are some effective factors on virtualization of tourism industry namely: technology revolution, networking and interdependency of tourism companies, political and economic limitation and globalization (Nordin, 2005). As it was mentioned before, discussion on VT is associated to Virtual Reality Technology. The term of Virtual Reality was initially expressed by Ivan Sutherland in 1965 and it is an interactive computer-generated medium that allows participants to create simulated experiences of both real and unreal situations (Burdea & Coiffet, 2003; Vince, 2004). By rapid evolving of VR technology, potential revolution of tourism industry is predictable that leads to

redefinition of this industry (Williams & Hobson, 1995; Mine, 2003). Guttentag (2010) defined VR as a use of computer-generated 3D environment - called a 'virtual environment' (VE) - which one can navigate and possibly interact that result in a real-time simulation of one or more of the user's five senses. He considered VR as a one of the ICT applications. Virtual world has been introduced in 2004 and after that Barfield (2006) developed the Second Life experience which is a completely integrated architecture to reduce the risk and increase the innovation and industrialization to those who attend as the Avatar.

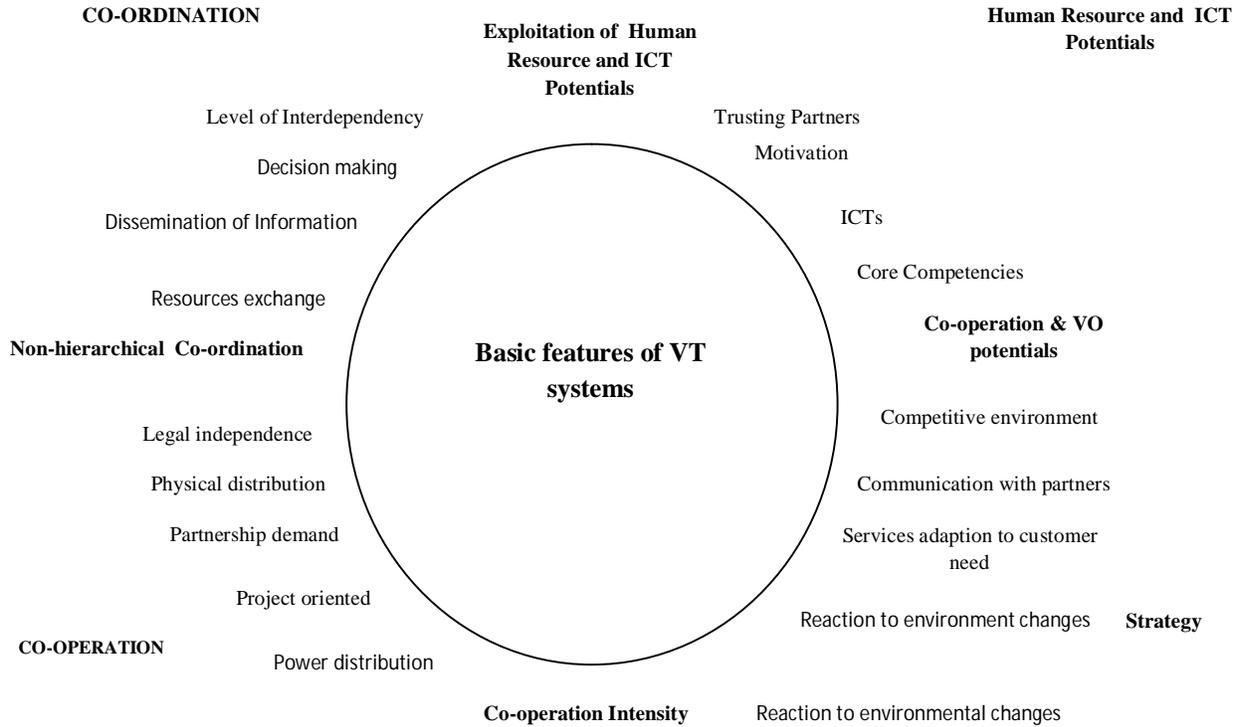
The other researchers argue that many components influence on the development of Virtual Tourism, including: psychological, economic, cultural, political, geographical, environmental and technological factors (Haywood, 1998; Ritchie *et al.*, 2003; Nordin, 2005). Dada (2006), Kamarinha and Afsarmanesh (2008) believed that the technological aspects such as CNOs and E-readiness are prerequisite of establishing and developing virtual tourism. According to these studies, in this study, the technological components which are the most important component for development of virtual tourism will be examined.

Electronic readiness via virtual tourism

E-readiness is a complex multilayered phenomenon (Gammack, 2004) which has several dimensions such as telecommunications infrastructure, human resources, and legal and policy framework (Bridges, 2005).



Fig. 1. The assessment of the basic features of virtual tourism system organizations



In every country, level e-readiness refers to the ability of a country to take advantage of ICT as an engine for the economic growth and sustainable development (Rahman, 2007). E-readiness is a measure of the degree to which a country, or nation or economy may be ready, willing or prepared to obtain the benefits that arise from information and communication technology (Dada, 2006 p.1). Therefore, e-readiness in the context of this research can be described as the capability to accept and apply the information and communication technology in the virtual tourism. Ruikar *et al.* (2006) have identified the aim of assessing the electronic readiness as the capacity of competition and an aspect to reduce the digital gap for making the ICT infrastructure and improve its applications in order to create the electronic and virtual businesses and expand the investment in these areas. According to the statistical data, Denmark, Sweden, Netherlands, Norway, United States, Australia, Singapore, Hong Kong, Canada and Finland have respectively gained 1 to 10 ranks in terms of e-readiness in 2009 (Wikipedia (2011) <http://en.wikipedia.org/wiki/E-readiness>). In this research, after reviewing the existing models of E-Readiness assessment, the "Noori's model" is chosen as a suitable one (Shirvani & Baneshi, 2009). Thus, the defined indicators for consideration the electronic readiness of virtual tourism are classified in three main areas, including: services and system readiness, infrastructure

readiness and organizational readiness. To determine these criteria, it is important to consider the international standards for their applications. Table 1 illustrates the examined criteria of E-Readiness assessment in virtual tourism based on Noori's model:

In the traditional tourism systems, the tourists have benefited from the services that supplied by tourism companies and travel agencies as well as online services. Now, it is important to consider the role of CNOs in providing a framework for implementation of Virtual Tourism, and therefore it is intended to assess the infrastructure of Virtual Tourism in this study.

According to Keinanen and Oinas-Kukonen (2001), Bagdoniene and Hopeniene (2006), Virtual Tourism

Fig. 2. Modeling perspectives in ARCON reference model

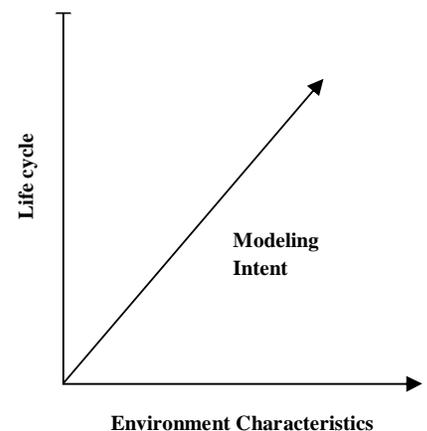




Table 2. Indicators of the Virtual Tourism Collaborative Networks (Derived from the ARCON reference model)

ARCON model (2008)	Life cycle Perspective	Creation	The formation of virtual tourism networks, Database loading. Include two phases: 1. Initiation 2. Foundation	Afsarmanesh Kamarinha-Matos (2005, 2008)
		Operation	Member registration, Establishment /maintenance of partners directory of profiles/competencies, Virtual tourism companies establishment and contracting	Quirchmayr <i>et al.</i> (2002) Kamarinha-Matos and Afsarmanesh (2008)
		Evolution	some changes to the virtual tourism networks, e.g. to its membership, structural relationships, roles of its members	Wang <i>et al.</i> (2002) Kamarinha-Matos and Afsarmanesh (2008)
		Dissolution	A short-term virtual tourism companies will typically dissolve after accomplishing its goals	Afsarmanesh, Kamarinha-Matos (2005, 2008)
		Metamorphose	Huge evolution leap within the virtual tourism networks. Such stage may involve the transfer of collected knowledge/information, as well as the members to a third party	Kamarinha-Matos and Afsarmanesh (2008)
	Environment Characteristics perspective	Endogenous Elements (Endo-E)	1. Structural dimension: Participants, Relationships, roles 2. Componential dimension: human elements, software and hardware resources, information 3. Functional dimension: processes in phases of the virtual tourism companies life cycle 4. Behavioral dimension: principles of trust and Collaboration, rules of conduct, , contracts	Wang <i>et al.</i> (2002) Kamarinha-Matos and Afsarmanesh (2008)
		Exogenous Interactions (Exo-I)	1. Market dimension: Interaction between virtual tourism companies and value chain 2. Support dimension: supported services outside the VT networks, e.g. training services 3. Societal dimension: Impacts, Legal issues, Public interactions 4. Constituency dimension: Attracting factors, Rules of adhesion, Sustainability factors	Wang <i>et al.</i> (2002) Kamarinha-Matos and Afsarmanesh (2008)
	Modeling intent perspective	3 different layer	1. General Representation (GR) layer: Interaction of VT networks with other systems in cyberspace 2. Specific Modeling (SM) layer: Interaction among VT networks 3. Implementation Modeling (IM) layer: Interaction among components of VT networks	Kamarinha-Matos and Afsarmanesh (2008)

Networks are independent enterprises where connect to each other in order to share competencies, resources and taking advantage of opportunities through ICT. Integration in the virtual Tourism networks allows companies to maintain the balance between co-operation and competition. In other words, it improves competitive environment and organizational performance with sharing inter-organizational knowledge. Since this study examines factors effect on Virtual Tourism, it is necessary to investigate some features of VT. Sieber and Franke (1998); Jagers, Jansen and Steenbakkers (1998); Bagdoniene and Hopeniene (2006) (Sieber & Franke, 1998; Jagers et al., 1998; Bagdoniene & Hopeniene, 2006) pointed some features of Virtual Tourism Networks: flat structure, focus on core competencies, service adaption to customer need, improvement in value-added products, unlimited geographical boundaries, continuous training and learning and high degree of flexibility in responding to the tourists demands. Fig.1 shows the basic features of the virtual tourism systems.

After reviewing the existing models in

CNOs area, the ARCON1 (A Reference Model For Collaborative Networks) proposed by Kamarinha-Matos and Afsarmanesh (2008) is used to assess the Virtual Tourism Networks. This model formulates the concepts and principles in CNOs which consists of three dimensions, namely: life cycle perspective, environmental characteristics perspective and modeling intent perspective. This paper is intended to examine the effective factors on the virtual tourism networks based on ARCON reference model (Fig. 2).

Table 2. illustrates the criteria of virtual tourism collaborative networks based on the components of ARCON model in three dimensions.

Methodology

Table 3. Reliability of the study

construct	concept	Number of questions	Cronbach's Alpha
e-readiness	Organization readiness	9	0.91
	Services and system readiness	9	0.92
	Infrastructure readiness	9	0.88
Virtual tourism collaborative networks		14	0.82
Virtual Tourism		10	0.84



Table 4. Goodness of fit tests

χ^2 /df	Root Mean Square Residual (RMR)	Goodness of Fit Index (GFI)	Adjusted Goodness of Fit Index	Root Mean Square Error of Approximation	Normed Fit Index (NFI)	Non-Normed Fit Index	Comparative Fit Index (CFI)
2.62	0.044	0.92	0.90	0.074	0.91	0.91	0.92

In this study, practical approach is considered according to expecting purpose and the type of data collection which is descriptive and correlative (Yin, 2003; Kumar & Ranjit, 2005). In addition, other aspects such as, investigating the impact of e-readiness dimensions (Organizational readiness, system and services readiness and infrastructure readiness) and collaborative Networked Organization dimensions (Lifecycle perspective, environment perspective and modeling intent perspective) on VT causes to choose the practical method chosen in this research. This method can also develop the practical knowledge about the quality of relation and the effectiveness between the assigned variables.

Data collection and analysis

The questionnaire comprises of three different sections. In the first section three questions related to personal information of the respondents are defined. Hence, 27 statements designed to examine the impact of e-readiness dimensions (Organizational readiness (OR), system and services readiness (SR) and infrastructure readiness (IR)) on virtual tourism collaborative networks. The last section which consists of 24 statements determined in a way that can investigate the impact of three virtual tourism collaborative networks dimensions (Life cycle, environmental characteristics and modeling

intent) on the virtual tourism. Respondents were asked to indicate their extent of agreement using a five point Likert scale (where 5 = extensively covered and 1 = weakly covered). In order to analyze and interpret the obtained data, Structural Equation Modeling (Confirmatory factor analysis for testing the construct validity and Path Analysis for Assessing of model fit and hypotheses test) as well as LISREL 8.54 and SPSS 18 software were applied. To determine the reliability of this study, Cronbach's Alpha method was used (Table 3).

For defining the validity of the questionnaire, content credit and construct credit methods were conducted. Content credit of this questionnaire was justified by five university professors and twelve managers from tourism companies, in addition to, distribution of questionnaire amongst the numbers of experts and scholars in the discipline that led to the significant credibility. Construct credit is carried on as follows:

Data was collected from the managers of tourism enterprises in Tehran, Iran. According to the report of Cultural Heritage Organization in Iran, the total number of tourism enterprises in this city is about 1300 units. 300 questionnaires forms were distributed between these managers that 297 of them were responded successfully. The results were put into the Excel sheet to be analyzed by SPSS 17 and LISREL 8.54 software. The samples were interpreted based on Morgan's table (Yin, 2003).

Table 5. Factor loading and t-values of the measurement model

Construct/concepts	Factor Loading	t-value
Service and systemic readiness		
Web site and Portal	0.55	14.88
Electronic Services Systems	0.57	15.19
Systems integration	0.47	12.13
Infrastructural readiness		
Intranet and Hardware	0.44	3.67
Value-added Services	0.67	15.49
Information Security	0.61	13.47
Organizational readiness		
Experts Readiness	0.55	10.37
Align IT strategy with organizational goals	0.45	5.41
Legal and Financial Readiness	0.48	7.51
Virtual Tourism Collaborative Networks		
Life Cycle	0.67	9.12
Environment Characteristics	0.70	8.20
Modeling Intent	0.50	5.76
Virtual Tourism		
Information Services	0.66	6.54
Interactional and Transactional Services	0.60	5.58

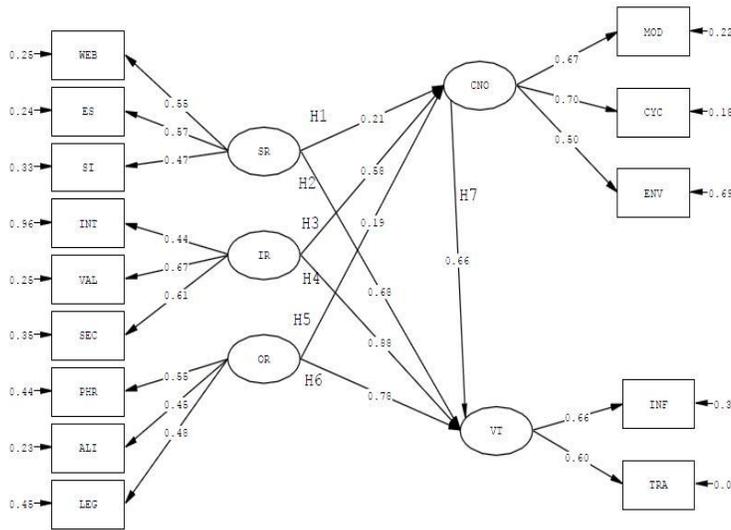
Structural Equation Modeling (SEM) with LISREL 8.54 (Petrousatou & Lambropoulos, 2007) was conducted to check and analyze the hypothesized relationships of the research model. SEM examines the inter-related relationships simultaneously between a set of posited constructs and those that measured by one or more observed items (measurements). The integrity of the statistical model describes how appropriately it fits to the set of observations. The goodness of fit typically summarizes the difference between the observed values and the expected values under the model in the question. These measurements can be used in the statistical hypothesis assessment. Generally, this method is used to assess the goodness of fit of the whole model values such as χ^2/df , RMR, GFI, AGFI, RMSEA, NFI, NNFI, CFI. The relative chi-square (chi-square/degree of freedom; χ^2/df), standardized root mean square residual (standardized RMSR), goodness-of-fit index (GFI), adjusted goodness-of-fit index (AGFI),



Table 6. Results of testing the hypotheses of the study using path analysis

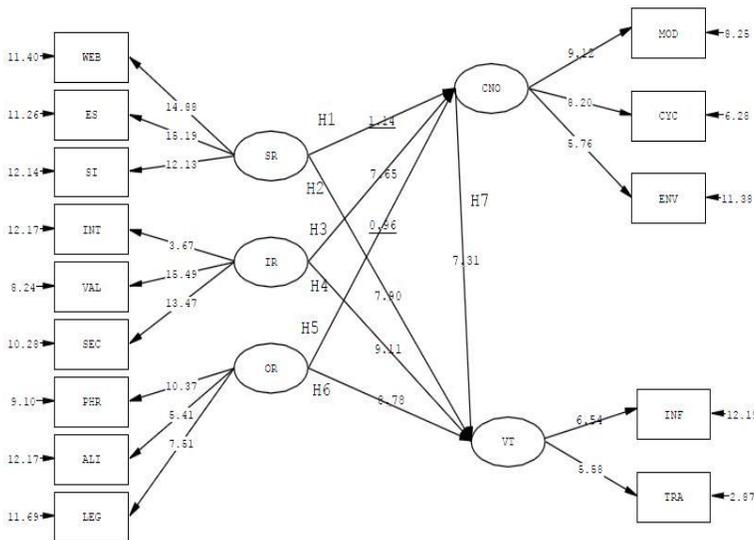
Hypotheses	Path		Factor Loading	t-Value	Testing Hypotheses
First	SR	CNO	0.21	1.14	Rejected
Second	SR	VT	0.68	7.90	Confirmed
Third	IR	CNO	0.58	7.65	Confirmed
Fourth	IR	VT	0.88	9.11	Confirmed
Fifth	OR	CNO	0.19	0.96	Rejected
Sixth	OR	VT	0.78	8.78	Confirmed
Seventh	CNO	VT	0.66	7.31	Confirmed

Diagram.1. Structural model of study to confirm the hypotheses in Standard estimate state



Chi-Square=172.66, df=67, P-value=0.00000, RMSEA=0.074

Diagram.2. Structural model of study to confirm the hypotheses in Standard estimate state



Chi-Square=172.66, df=67, P-value=0.00000, RMSEA=0.074

normed fit index (NFI) and comparative fit index (CFI) were applied as the goodness-of-fit measures. Due to sensitivity of the chi-square test to the sample size, the relative chi-square was used (it should be three or less for an acceptable model (Tomer & Pugesek, 2003). Standardized RMSR should not be greater than 0.10 and GFI, AGFI, NFI, and CFI should be over 0.90 to be acceptable (Hair *et al.*, 2006). The rate of each index presents in Table 4.

The measurement model with all three constructs was applied for confirmatory factor analysis (Petroutsatou & Lambropoulos 2007). Table.5 presents factor loading and the corresponding t-values of indicators in the measurement model. All loadings are over 0.5 and each indicator is at confidence level of 0.05. The measurement model shows a good level of fit.

Result

Confirmatory factor analysis

Structural Equation Modeling (SEM) with LISREL 8.54 (Bae, 2005; Petroutsatou & Lambropoulos, 2007) was applied to assess and analyze the relationship between the construct and its concept in the research model. The aim of Confirmative Factor Analysis is to confirm the special factorial structure according to its all constructs relations. Based on this analysis the covariance matrix is used (Table 5). In table.5 the concept of each construct is evaluated based on two criteria: factor loading and t-Value. Petroutsatou and Lambropoulos (2007); Hair *et al.* (2006) and Tomer and Pugesek (2003) believe that the factor loading have to be more than 50% and t-Value in Significance level of 95% have to be out of (- 1.96,1.96) range. This proves the accuracy of the questionnaire and every construct concept. As can be seen, Network Connectivity factor does not have the required terms, thus it is omitted for Construct validity determination as well as the rest.

Testing hypotheses

The specification of the model consists of the translation of the verbal hypotheses into a series of equations that previously presented in the form of a causal or a path diagram. The path diagram shows the causal relationships amongst all variables in the system. It should be based on the primary knowledge of such relationship which is ultimately related to the earlier experience or the theoretical base (Fox, 2003). Thus, the path diagram presents the working hypothesis about the causal relationship between the variables. Therefore, in this study test assumption was used.

- $H_0: \alpha = 0$ Null hypothesis: Correlation between two variables is not significant
- $H_1: \alpha \neq 0$ Alternative hypothesis: Correlation between two variables is significant

To address the research questions and test the hypotheses, the percentages of explained variance (R^2) were assessed for each endogenous variable and the path coefficients of the hypothesized model. Diagram.1 shows the structural model of the study to confirm the first and the second hypotheses of the study in the standard estimation state.

Diagram.2 illustrates the important obtained parameters of the hypotheses test. In this way, significant values for the hypotheses are placed out of (-1.98, 1.98) interval. Therefore, relations formed are out of the null hypothesis and indicate the ratification of the hypotheses of the research.

Based on the above analysis, the results of the testing hypotheses are presented in Table 6. Standard estimation test and the significant value to confirm or reject the considered hypotheses (significance of hypotheses) were conducted too.

Discussion and conclusions

Admittedly, it is noticeable that in spite of increasing in demand for travelling, VR attract tourist by providing new form of tourism called "Virtual Tourism". It means, nowadays, tourists use ICT to travel virtually around the world without presence at the destination. This study well mentioned that VT transforms traditional form of tourism even in developing countries like Iran, Pakistan and India. No matter what profitability, VT would open new ways for improving tourist satisfaction.

Virtual Tourism has been acquiring high amicability on IT and tourism management (Palmer & McCole, 2000; Barradas & Pinto-Ferreira, 2009). It improves tourism industry in order to developing smart and virtual organizations called CNOs (Camarinha & Afsarmanesh, 2008). Some researchers examined the relationship among e-readiness, VT and CNOs (Camarinha & Afsarmanesh, 2008; Karanasios, 2008). Therefore, in this paper ARCON model (2008) and Noori's model (2004) were used to examine the relationship among three variables and their dimensions.

The hypotheses of research show the importance of e-Readiness and CNOs in virtualization of tourism industry. Dada (2006); Karanasios (2008); Shirvani and Banesh (2009) believed that the role of e-Readiness (service and systemic readiness, infrastructural readiness and organizational readiness) is considerable to implementation of VT plans. Also Camarinha-Matos and Afsarmanesh (2008) stated that Collaborative Networked Organizations are infrastructure of virtual businesses such as virtual tourism. Based on the results obtained, the first and the fifth hypotheses were not confirmed. In other word, Iran has a large gap towards being successful in using VT for attracting tourists, while from infrastructural perspective, Iran is one of the most popular countries in Middle-East region (H3 & H4). Therefore, tourism enterprises should change their structure to the collaborative networked organizations (CNOs) by relying on capabilities to improve tourism industry as well as

increasing the number of national and international visitors since Iran has a long civilization with many tourist attractions.

In terms of research model, the results illustrate that model is suitable for establishing VT in Iran and Other developing countries. Main variables of the research include: organizational, systematic and infrastructure readiness and virtual tourism collaborative networks were well placed in the model. Conceptual model of the study presented that the spite of low effect of some dimensions of e-Readiness on CNOs, it has the greatest impact on VT. Moreover, variables approve that model is a comprehensive one in establishing, developing and subsequently enhancing VT in developing countries. However, it is essential to note that acceptance of the current model, does not confirm the rejection of other proposed models, but based on the current situation and according to the fitness model standards in LISREL 8.5 software it has the necessary credibility.

Overall, this paper tried to introduce success critical factors for accomplishing VT in Iran. In this case, it is better that authorities pay more attention to the role of CNOs and e-Readiness as principle alternatives to establish VT in Iran. These factors would lead to the remarkable leap to high development levels in tourism industry.

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