The Investigation and Comparison of the Readiness Assessment Models of Iranian Small and Medium Enterprises Entering into the E-Commerce Market

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Abstract

In most organizations, despite heavy investment in using the ICT, development and penetration of its wide applications moves on slowly, however, the main reasons for such a problem can be the lack of correct understanding of how to invest, the organization's unwillingness to adopt the information technology, the organizational inflexibility against changes emenating from it, and also inadequate recognition of the state of the organizations' e-readiness.

There are different models of the e-commerce readiness assessment that have presented different Indexes and methods of assessing the rate of readiness. The existence of the e-commerce readiness assessment models leads to more accurate planning to smart enter into the information age, and provides a ground for monitoring the performance of various business sectors. Therefore, with respect to the necessity of the above-mentioned topic, in this study, a review of the literature on the subject is conducted so as to identify, examine, and compare its various models in small and medium enterprises.

Keywords: E-Readiness Assessment Models, Small and Medium Enterprises, Electronic Commerce.

1. Introduction

Over the past decade, the crucial and key role of the information and communication technologies in facilitating the transition process and change of organizations has been well proved. In the information age, the e-readiness assessment is increasingly important for the planning to develop necessary capabilities of the various technical and organizational aspects. For this reason, several different electronic assessment tools have ever been supplied and used by consulting firms and universities [1].

The adaptability to the market and the need of the day, is something that can not be brought about of a large and interconnected structure and, thus, to achieve rapid development and delivery of new products, the only effective way is to create and develop conditions in which small and medium sized businesses can be established and compete. That is why special attention shouldd be paid to these types of businesses. Improvement in small and medium businesses helps them grow, moreover, this can help to reduce the gap between developing and developed countries.

The success of e-commerce is respectively obtained when its preliminaries are provided based on the principles of e-commerce readiness.

2. The operational definition of variables
1.2 E-Readiness

So far, numerous definitions of e-readiness have been given, however, in almost all of them the e-readiness has been defined as the rate of readiness and ability of a region in correct exploitation and optimal use of ICT. A number of definitions of e-readiness are offered below. The e-readiness, is the ability to use ICT in line with a nation's economic development and also increase in the welfare of that country. E-readiness is a relatively new concept which has developed due to the rapid penetration of the Internet throughout the world, because of substantial progress in the use of ICT in the business and industry. E-readiness is measured by the degree to which a country, nation or economy may be ready, and willing or ready to achieve benefits and profit from the information and communication technologies.

E-readiness is a concept that was formed in the late 1990s [3], in order to provide an integrated framework for assessing the extent and depth of the digital divide between developed and developing countries.

1.2.1 E-Readiness Assessment

E-readiness assessment will result in describing the current conditions of applying information technology in the country or organizations. Also, it helps to identify the existing problems in this field, and to extract desirable solutions to such problems. According to Peters (2001), the e-readiness assessment for different people have different meanings in different contexts and is used for different purposes.

2.2 The Concept of E-Commerce Readiness

The concept of readiness is studied at various levels for a society, economy, country and organization. Generally, many definitions have been provided to e-commerce readiness each of which defines e-commerce readiness for itself based on the goal that follows. E-readiness means is the ability of a society, the economy of a country, organization, department or workgroup to successfully Join, apply and take profit from the ICT in their such business processes as electronic commerce. Thus, the e-commerce readiness is considered as a subset of e-readiness of an organization or a country.
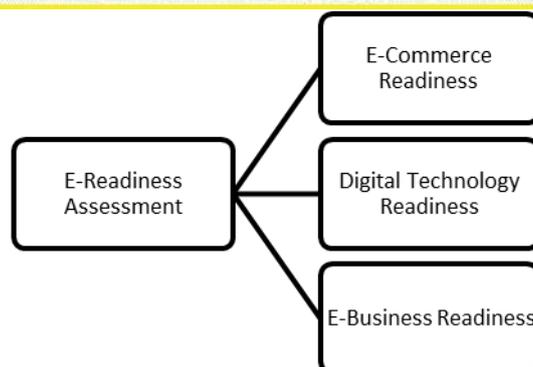
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Figure 1: E-commerce Readiness Status

2.2.1 E-Commerce Readiness Assessment

The Success of the Internet company does not depend only on electronic value chain, it is, however, related to other factors such as the readiness of customers, suppliers and business partners in the electronic interactions and transactions. For this reason, to be invested with a successful e-commerce in business, effective factors on the e-commerce must be evaluated before entering business readiness for e-commerce and its amount of utilization. Many models have been considered for this work that have come into vogue with respect to the existing factors in any business.

3.2 Comparison Between E-Readiness and E-Commerce Readiness

E-commerce readiness is a subset of the e-readiness. In the e-readiness, the aim is to assess the rate of readiness of a country or organization to take advantage of the ICT. The e-commerce is one of these benefits. In the e-commerce readiness, only factors affecting the growth and the e-commerce adoption are discussed, while in the e-readiness at both national and institutional levels, we consider all the factors influencing the growth of an entity in use and enjoyment of the ICT. To have an electronically ready community, one of the factors is the readiness of that collection to enter into the e-commerce [5], [4].

4.2 SMEs

Generally, industries are divided to the large, small and medium industries. With regard to this, each country has offered a definition in according to its own particular circumstances [6]. In fact, the prevailing economic and industrial conditions in each country, represents its SMEs. These definitions have been given mainly based on quantitative measures such as number of employees and turnover rate. Although any classification based on quantitative criteria gives an easier the definition, such criteria are not an appropriate tool for classification. However, the companies' qualitative characteristics are of high significanc in this division. [7]

Usually, SMEs   are invested with three qualitative attributes: ownership and unit management, personal property and family, and independence from other firms. These qualitative characteristics should be considered as SMEs in the definition of the status and functions of companies. Otherwise, mere reliance on the quantitative measures, will make the implementation of the SMEs related programs and policies problematic [8]. Of course, beyond the issue of the company size (by the number of employees), SME and other large companies have substantial differences in other issues as Table 1 indicates: [9]

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Table 1: Comparison of SMEs against the large enterprises

Large Enterprises	SMEs
Hierarchical structure with several layers of management	The flatbed structure with a few layers of management
Rigid and inflexible structure and information flow	Information flow and flexible structure
The low advent of innovation	The advent of high innovation
Slow accountability to environmental changes	Rapid accountability to environmental changes
High degree of formalization	Low degree of formalization
Low independence and authority of the staff	High independence and authority of the staff
Access to financial and human resources	Limited access to financial and human resources
Staff's high resistance to change	Staff's poor resistance to change
individual creativity is Stifled and suppressed	Individual creativity is encouraged
Non-intuitive and consultative decisions made by decision-makers	Intuitive decisions made by decision-makers (usually the owners)

(Source: Ghobadian et al., 1997, p. 136)

The following table provides the definition of the SMEs in selected countries: [10]

Table 2: The definition of SMEs in selected countries

Classification criterion	The definition of SMEs		Country
An annual turnover of less than 40 million euros and the balance sheet less than 27 million euros	1-9 employees	Micro industries	The Europe Union member states
	10-49 employees	Small industries	
	50-249 employees	Medium industries	
Number of Employees	Less than 100 employees	Small industries	Australia
	Between 100 and 499 employees	Medium industries	
Number of Employees	Less than 100 employees	Small & Medium industries	Indonesia
The number of employees and sales	Less than 100 employees and with sales of less than 5 million Canadian dollars ($)	Small industries	Canadian
	Less than 100 employees and with sales of less than 5 million Canadian dollars ($)	Medium industries	
Number of Employees	Between 50 and 100 employees	Small industries	China
	Between 101 and 500 employees	Medium industries	
The number of employees and Finance	Less than 20 employees	Small industries	Japan
	Between 20 and 300 employees or less than 100 million ¥ of capital	Medium industries	
The number of employees and Finance	Less than 300 employees and capital between 20 and 80 billion ₩ Korea	Small & Medium industries	South Korea
The number of employees and sales	Less than 150 employees and annual sales turnover less than 25 million RM	Small & Medium industries	Malaysia
Number of Employees[1]	Fewer than 500 employees	Small & Medium industries	USA

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[1] In this country, the term used by small businesses rather than small industries.

(Source: Ghasemi et al., 2009)

In Iran, There are also various definitions of the SMEs in various organizations. According to the available statistics of the industrial workshops of Iran, industrial workshops set with 10 to 49 people are taken into account as small businesses, workshops with 50 to 149 employees are placed in the category of medium firms, and workshops with more than 150 staff members are Included among the large manufacturing industries [11].

5.2 The SMEs and E-Commerce Readiness

Over the recent years, the importance and role of small and medium industries in industrialized and even developing countries has increased. With the advent of the new technologies in production and communication in recent decades, developments have emerged in the potential of industrial units, and also in the methods of production and distribution and organizational structure, that have generally added to the importance of small and medium businesses. These institutions, have organized the private sector structure, and include about 90% of the world's economic enterprises. The impacts of the SMEs on the economic prosperity of countries can be expressed as follows:

A. Effective role in generative job creation,

B. Major portion in providing the financial resources of countries,

C. Guardians of the systematic structure of productive capacities,

D. Flexibility and innovation of the SMEs with regard to the developments process of globalization can be responsive to changing the social and economic conditions of countries,

E. The development of the SMEs has been influential in the advancement of democracy and encourages the entrepreneurs to participate in the the political, economic and social systems.

F. The potential features of the above brought about special attention to the small and medium, relevant and consistent enterprises, but not to separate and disintegrated units. Among the strategies of both developed and newly developed countries to ensure free market competition, and prevent monopoly of the large companies, is to exert and apply special policies to promote small and medium industries and to facilitate the entry of entrepreneurial firms in the economic sphere.

So, for an SME to have a successful e-commerce in a way that this success guarantees the promotion and growth of the country's position in international trade, it needs to identify and evaluate factors affecting the success of the electronic commerce in their businesses before entering into such a field. Accordingly, it can determine the amount of readiness to enter this sector until if necessary so as to be able to solve cases faced with weakness and deficiencies. In this way, it can have a successful e-commerce. It is possible by models and methods presenting the electronic and e-commerce readiness [12].

3.   E-Readiness Assessment Tools

The popular tools ever proposed in the field of e-readiness are classified in two micro and macro levels, hence, that readiness indicators at the macro level, are normally applied for ranking and comparison between countries with known international institutions whereas the e-readiness assessment at the micro level deals with the comparison of more detailed indicators such as network, applications, web access and readiness known as NAWAR, and also the comparison of companies, NGO's and organizations within a country or between countries. So far, most e-readiness assessment models and tools at the micro level have been often based on the adoption of the e-commerce, and appropriate to the target society. In table 3, a comprehensive classification of the global e-readiness assessment models at the macro level and its criteria has been shown.

Table 3: E-readiness assessment models at the macro level

Model Criteria	Researcher / Organization / Center Provider / Institution	Model / Year
Infrastructure, Access, Network Applications and Services, Network Economy, enablers	Project group of policy making of the computer systems	CSPP(1998)
Comprehensiveness, dispersion, Part absorption, Connection Infrastructure, Organizational Infrastructure, Skill in Using	Mosaic Group, the first time at Princeton University as a global project of the Internet Publishing	Mosaic(1998)
ICT Infrastructure, Legal and Political Environment, Activities of Non-governmental Organizations, Skilled Labor	International Development of America	USAID(1999)
Network Training, Access Policy, Economy, Society	Center for International Development at Harvard University in collaboration with IBM	CID(2000)
Access to Infrastructure, Access to Network Services, The Level of Use of the Internet, Promoting and Facilities, Skills, Position the Digital Economy	Organizing Committee of the e-commerce and the Asia-Pacific Economic Cooperations group	APEC(2000)
Price, Confidence, Politics, Labor, Support Business Agencies of E-Commerce, Technology, Customer Attitudes	World Information Technology Services Alliance	WITSA(2000)
Ability to Connect, E-Leadership, Security, Human Resources, Business Environment	McConnell International Institute in collaboration with the World Information & Services Technology Alliance	McConnell(2000)
IT Infrastructure, Business Environment, Social and Cultural Environment, Legal Environment, Government Policies, Business Reception	Intelligence Unit of the Economist Magazine in the UK	EIU(2000)
Telecommunication, Applications, Internet, Security, Education, Skills, E-Commerce, E-Government, E-Health, Transport, Social Affairs	Europe's Program Information Society Commission	SIBS(2001)
History, The Main Causes of Internet Development, Development of the Internet and ICT Policy, Negotiations between the Main Actors	Center for International Development and Economic Management at the University of Maryland	CIDCM(2001)
Network Users, Enablers	World Economic Forum	NRI(2001)
Economic Incentives, Education, Innovation, ICT	Knowledge Assessment Group of the World Bank	KAM(2002)
Infrastructure, The Ability to Access, Level of Knowledge, Quality of Service, Internet usage	International Telecommunication Union	DAI(2003)
Access, Ability, Opportunity	The Research Team at MIT	MIT(2004)

The presented models to assess the e-readiness at the national level are very numerous each of which has managed to assess the e-readiness from its own perspective. But, the e-readiness models at the firm-level, have been very rare with being soley proportional to that region. The most famous e-readiness models at the firm-level are:

A. E-business Maturity Model (EMM),
B. Perceived E-readiness Models (PERM),
C. Model KPMG,
D. Model P313.

Table 4: E-readiness assessment models at the micro level

Indicators	Target	Organization / Provider Center	Model / Year
Organization strategy, Performance Management, Delivery and Process Operations of the Value Networking, Security, System, Technology, Taxation and Law.	E-business Assessment	Carnegie Mellon University in the United States	EMM(2004)
Organizational E-Readiness with Variables Such as Knowledge, Business Resources, Commitment and Strategy, Environmental E-Readiness with Variables Such as Government Readiness.	Evaluation of e-commerce adoption by organizations	Manchester and Auckland Universities Cooperation	PERM(2003)
Readiness, ICT Policy and Infrastructure, Skilled Labor, Process, Competence and Merit.	Assess the level of e-government and e-leadership organizations	Department of Electronic Technology in India	P313(2003)
Electronic Strategy, Architecture, Risk and Project Management, Organizational Capabilities, Supply Chain Management, Performance Management.	Assess organizational capabilities to implement electronic serving to Canadian citizens	KPMG Consulting Firm	KPMG(2000)

Table 5: The levels of the e-readiness assessment models

Level	E-readiness assessment models
Information Infrastructure	CID, APEC,CSSP, MCCONNELL, EIU, ITU, USAID, CIDCM, NRI
Ability to provide and availability of the Internet	CID, APEC, CSSP, MCCONNELL, EIU, CIDCM, NRI
Network Speed and Quality	CID, APEC, CSSP, MCCONNELL, EIU, ITU, USAID, NRI
Network Hardware and Software	CID, APEC, CSSP, MCCONNELL, EIU, NRI
ICT Service and Support	CID, EIU
Skills and Human Resources (Information Literacy)	CID, APEC, CSSP, MCCONNELL, EIU, ITU, USAID, NRI
Online Organizations and Individuals (Employees and Departments)	CID, APEC, CSSP, MCCONNELL, EIU, ITU, NRI
Local Appropriate Content	CID, APEC, EIU
Financial and Investment Support for ICT Development	McConnell, EIU, ITU, USAID
ICT in the Workplace	CID, APEC, CSSP, EIU
ICT job opportunities	CID, EIU
B2C E-Commerce	CID, APEC, CSSP, EIU
B2B E-Commerce	CID, APEC, EIU
E-government	CID, APEC, MCCONNELL, USAID, NRI
Legal and Regulatory Environment (Such as Copyright Law)	CID, APEC, MCCONNELL, EIU, USAID, NRI
IT Policy and Management	CID, CSSP, EIU, CIDCM
The Benefits of E-Services	APEC, ITU
Cryptography Security (eg, common infrastructure of digital signatures, privacy, etc.)	APEC, CSSP, MCCONNELL, EIU, USAID
Degree of Innovation	EIU, CSPP
Industry Standards	APEC, EIU

Table 6: Comparing the most important e-readiness assessment models in terms of evaluation method

Questionnaire	Statistical Methods	Successful Experiences	Analysis of Events and Past Records	Model
*	*			CSSP
*	*			CID
*	*			APEC
*	*			WITSA
	*	*	*	McConnell
	*			Crenshaw & Robinson
	*	*	*	CIDCM
*	*	*	*	MOSAIC
	*		*	USAID
	*			ITU
	*			ASEAN
*		*	*	SIDA
	*			Info DEV

Table 7: Comparison of e-readiness assessment models in terms of assessment results

Prohibition	Recognition	Description / explanation	Model
	*		CSSP
	*		CID
*	*		APEC
	*		WITSA
	*	*	McConnell
		*	CIDCM
		*	MOSAIC
		*	USAID
*	*		ITU
*	*	*	ASEAN
	*		SIDA
	*	*	Info DEV

In recent years, due to multiplicity of the e-readiness assessment models with different purposes, the new discussion on assessing the models, and identifying the common components has been proposed. Also, some researchers, depending on the local conditions of their community, have managed to design a framework for evaluation of their own region.

4. E-commerce Readiness Assessment Models

These models are divided into two national and firms levels in terms of centralization levels, each of which includes other types of models for themselves. We'll continue to review and compare them:

4-1 National Level Models:

These models measure readiness of an economy and society to enter and exploit the advantages of the e-commerce which are in the form of Table 8.

Table 8: E-Commerce Readiness Assessment Models at the Macro Level

Model Criteria	Researcher / Organization / Center Provider / Institution	Model / Year
Knowledge and Innovation Processes based on New Economy, Electronic Leadership and Government, Appropriate Financing Infrastructure, Content Infrastructure (including Content Management Processes), Human Infrastructure (including Content Distribution Network), Access to Information and Communication Systems	California Institute of Technology	GRANT(1999)
Access to Infrastructure, Access to Network Services, Level of Internet Usage, Promoting and Facilities, Skills, Position the Digital Economy	Organizing Committee e-commerce and the Asia-Pacific Economic Cooperation	APEC(2000)
Price, Confidence, Politics, Labor, Supporting Business Enterprises of E-Commerce, Technology, Customer Attitudes	World Information Technology Services Alliance	WITSA(2000)

4-2 Micro-Level Models:

These models are evaluated based on indicators and factors they define, assess a firm or an organization's readiness rate for entering into the e-Commerce, and changing the conduct of trade and business processes from a traditional model to a modern and digital model which are described in Table 9.

Table 9: E-Commerce Readiness Assessment Models at the Micro Level

Indicators	Target	Organization / provider center	Model / Year
Technology Readiness: IT Infrastructure, Use of IT, IT Experience, Understand E-Commerce. Organizational Readiness: Size of the Organization, Scope of Organization, Management Support. Environmental Readiness: Competitive and Customer pressure, Government Support, National Infrastructure, Trading Partners Pressure.	Three aspects of Readiness: Technical, Organizational, Environmental	Tronatsky	TOE(1990)
Knowledge, Human Resources, Business Resources, Technological Resources, Commitment, Organizational Structure (Referred to as Internal Factors) E-Readiness Market Forces, Industry E-Readiness, E-Government Readiness (as External Factors)	Internal and External Readiness Assessment	Assess the Readiness of E-Commerce in Africa	Molla & Licker(2000)
Organization: Organizational Characteristics, Competitive of Individual, Technology Resources, Business Processes. Individual: Employee Behavior. Environmentally: Market Forces, Support Industries, Government.	Three aspects of Readiness: Organization, Personal, Environmental	Zakarya, Assess the Readiness of E-Commerce in SMEs in Malaysia	IOE(2010)

* In terms of evaluation method, all tools use the questionnaire method.

Table 10: Comparison of E-Commerce Readiness Assessment Models in terms of the Highest Focus

IOE	Molla & Licker	TOE	WISTA	APEC	Grant	Level of Focus
*	*	*		*		Organizational Factors
*	*	*	*		*	Environmental Factors
*						Management Factors
*	*		*	*		Innovation

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The proposed models show three initial results: description, identification and prohibition. The descriptive tools present a explanation description of what has taken place. The identification tools, recognize problem areas, but they do not determine how to deal with the problem. Prohibition tools clearly state activities that must be done in the form of a clear-cut procedure [15].

Table 11: Comparison of E-Commerce Readiness Assessment Models in terms of Evaluation Results

IOE	Molla & Licker	TOE	WISTA	APEC	Grant	
❋			❋		❋	Description
❋	❋	❋	❋	❋		Identification
❋	❋		❋	❋		Prohibition

The comparison of models in terms of the level of details which has been presented in Table 12, scores the focus of each of models   on a certain subject ranging from 0 to 3, in a way that 3 means complete coverage of the subject while 0 means the exclusion of the same issue [16] & [17].

Table 12: Comparison of the E-Commerce Readiness Assessment Models in terms of details under investigation

IOE	TOE	WISTA	APEC	Grant	
۲	۱	۲	۱	۰	Management
۳	۳	۳	۱	۰	Organizational factors
۳	۲	۳	۲	۲	Environmental factors
۱	۱	۲	۲	۱	Innovation
۲	۳	۱	۳	۱	Technology

5. Conclusion

The existence of the e-commerce readiness assessment models has caused a more meticulous planning toward smart entry into the information age. So far, various models of e-readiness assessment and preparation of the electronic commerce have been supplied and used by both consulting firms and universities. A partial look at each of these models, indicates the readiness of a community for the utilization of the information technology and e-commerce. At a closer look, such models are invested with massive and varied definitions together with different measurement methods. By investigating the methods and models, we can come to the conclusion that more traditional methods have more emphasized on the access to the IT infrastructure, with a focus on ownership, accessibility, and the financial power to provide infrastructure. But over time, the indexes have been directed to focus on the aspects that bring about the e-readiness and reduce the digital divide.

Unfortunately, there is no distinct model or index to assess the readiness of e-commerce for theSMEs in our country, in addition, the only criterion for measurement, is to report domestic and foreign organizations and institutions, so it is necessary that the report of the business e-commerce readiness in its various fields to be at the focus of attention so as to codify the solutions to increase the e-commerce that guarantee the realization of the knowledge-based development programs through the examination of the strengths and weaknesses. On the other hand, the SMEs as the major part of any country's economy, have an essential role in the improvement and promotion of the economic indexes and, therefore, the adoption of innovative and new methods and tools to do the process and business

affairs such as e-commerce plays a vital role in the success of such organizations, and consequently in the country's development.

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