DESIGNING AN ASSESSMENT TOOL FOR MEASURING E-READINESS OF IRANIAN ICT COMPANIES

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ABSTRACT

This paper proposes an e-readiness assessment model for evaluating the e-readiness of ICT Companies of Iran. The proposed e-readiness model consists of dimensions and indicators which are selected by a multilateral survey of existing frameworks and models of nations and SMEs in e-readiness assessment area. The results of this research show that the two dimensions, networked applications and services, are at a low level among the Iranian ICT companies whereas electronic infrastructure dimension is at the highest level.

Keywords: Information and Communication Technology (ICT), E-readiness, digital divide, Iranian ICT companies

INTRODUCTION

Measuring the access and use of ICT is called e-readiness which is the status or quality of readiness for a society or an economy to use electronic technology (Bridges, 2005a). High level of e-readiness allows enterprises to transact business electronically in order to achieve less turn-around time, faster delivery of services, enhanced product choices, etc. (Mutula & Brakel, 2006).

Due to its importance, e-readiness assessments of businesses are studied by various individuals and organizations using a number of indices and models (Bridges, 2005b). The Most important organizations who are working in this field are those of Economic Co-operation and Development (OECD), World Information Technology and Services Alliance (WITSA) and Asian Pacific Economic Corporation (APEC) (OCED & WITSA, 1999; APEC, 2000).

In this research, e-readiness assessment models of the nations and small and medium-sized enterprises (SMEs) are surveyed in order to make a holistic model for e-readiness assessment of ICT Companies. Then, the proposed model is applied for e-readiness measure of three ICT Companies in Iran.

LITERATURE REVIEW

The e-readiness concept was invented to provide a unified framework to evaluate the breadth and depth of the digital divide between more and less developed or developing countries in the late 1990s. The first efforts in defining e-readiness were undertaken in 1998 by the Computer Systems Policy Project (CSPP) when it developed the first e-readiness assessment tool known as Readiness Guide for Living in the Networked World. CSPP defined e-readiness with respect to a community that had high-speed access in a competitive market; with constant access and application of ICTs in schools, government offices, businesses, healthcare facilities and homes; user privacy and online security; and government policies which are favorable to promoting connectedness and use of the network (Bridges.org, 2001). With the development of the first e-readiness tool, several e-readiness tools have been emerged by development agencies, research organizations, universities, business enterprises and individuals.

Tools for Measuring E-Readiness

Some pioneer organizations in developing e-readiness assessment tools are: McConnell International (MI), a global technology, policy and management consulting firm (with its Ready? Net.Go tool), International Development centre at Harvard University (with its Network Readiness Index tool), Economist Intelligent Unit (with its e-readiness Rankings), the United Nations Conference on Trade and Development (UNCTAD)(with its ICT Development Index), Mosaic Group (with a Framework to assess Diffusion of the Internet) (Rizk, 2004).

Largely, all the e-readiness tools measure the e-readiness phenomena at national level across key sectors of the economy and in general each of the tools uses a different definition of e-readiness and techniques of its measurement (Bridges.org, 2001). Docktor (2002) alluding to these variations observed that the diversity of e-readiness definitions represented the multiple levels of ICT development and the exact definition of what constituted 'e-readiness' was still open for debate.

E-readiness assessment models measure various areas like e-government, e-business, e-learning and etc. Consequently, due to this research's concentration on E-readiness assessment for ICT companies, Literature review of e-business assessment tools has been mentioned.

The World Information Technology and Services Alliance research (WITSA) (1999) focused on the direct experiences of companies with e-commerce and their subjective views of what is needed to promote e-commerce. The questions cover a range of issues, including: barriers to technology industry, role of consumer trust, problems with e-commerce technology, internal business practices that support e-commerce, workforce problems, taxes, public policy issues, and resistance from consumers (WITSA, 1999).

Barua et al., (1999) proposed an assessment method for measuring the Internet Economy. The Internet Economy Indicators seek to provide a foundation for conceptualizing and measuring the various components of the Internet Economy. These indicators – the Internet Economy Revenues Indicator and the Internet Economy Jobs Indicator – are built on an analysis of four layers of the Internet Economy. The Internet Economy Indicators divide the Internet Economy into four distinct but related layers: Internet infrastructure, Internet applications, Internet intermediaries and Internet-based transactions (Barua et al., 1999).

Asian Pacific Economic Corporation (APEC) (2000) define readiness as the degree to which an economy or community is prepared to participate in the digital economy. Readiness is assessed by APEC by determining the relative standing of the economy in the areas that are most critical for e-commerce participation.

RESEARCH METHODOLOGY

Initial Design of the Questionnaire

From the literature study of numerous tools for measuring e-readiness of businesses, a preliminary questionnaire was designed that consists of five dimensions for rating e-readiness of ICT companies in Iran. The five dimensions posses a number of indicators (figure-1):

1. Basic infrastructure and technology (20 indicators)
2. Access to network applications and services (14 indicators)
3. Promotion and facilitation in the ICT sector and trade in ICT goods (10 indicators)
4. Human resources and Skills (9 indicators)
5. Positioning for the digital economy through healthy business environment to conduct e-business ("networked world enablers") (13 indicators)

The initial questionnaire was sent to 25 managers of ICT companies listed in the mailing list of the High Council of Informatics (HCI). HCI is the coordinating office for ICT companies operating in the Iranian market. Currently, there are 2073 ICT companies listed in the HCI mailing list. HCI also evaluates and ranks the ICT companies; there are 6 levels of ranks: from 1 (weak) to 6 (strong).

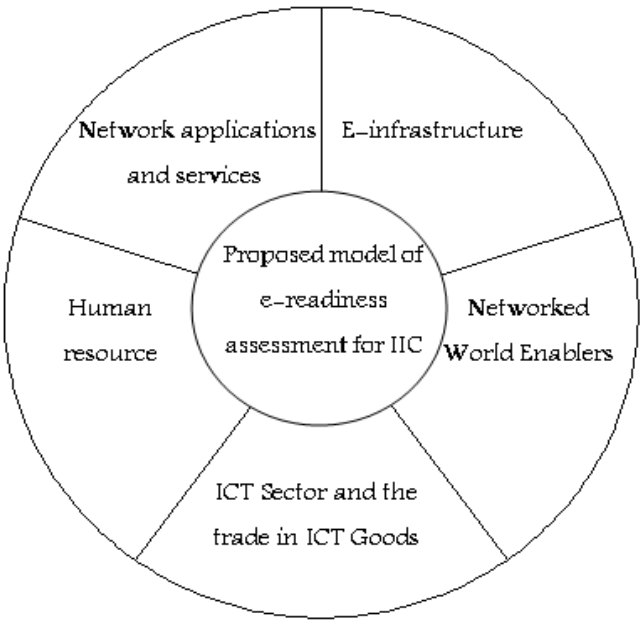


Figure-1: The five dimensions of the tool

The initial questionnaire was sent to 25 companies that were randomly selected from the HCI list. The recipients (managers of the companies) were asked to comment on the format, quality and importance of the dimensions and the indicators of the initial questionnaire. There were 10 respondents. Using the feedback from the respondents, the questionnaire was revised. Additionally, 5 renowned experts were selected from the companies that were awarded "the Bests of the year" by the HCI; these experts have a expertise of ICT and e-readiness, due to their educational qualification and working experience. These experts were also evaluated and improved the composition of the questionnaire.

Data Collection

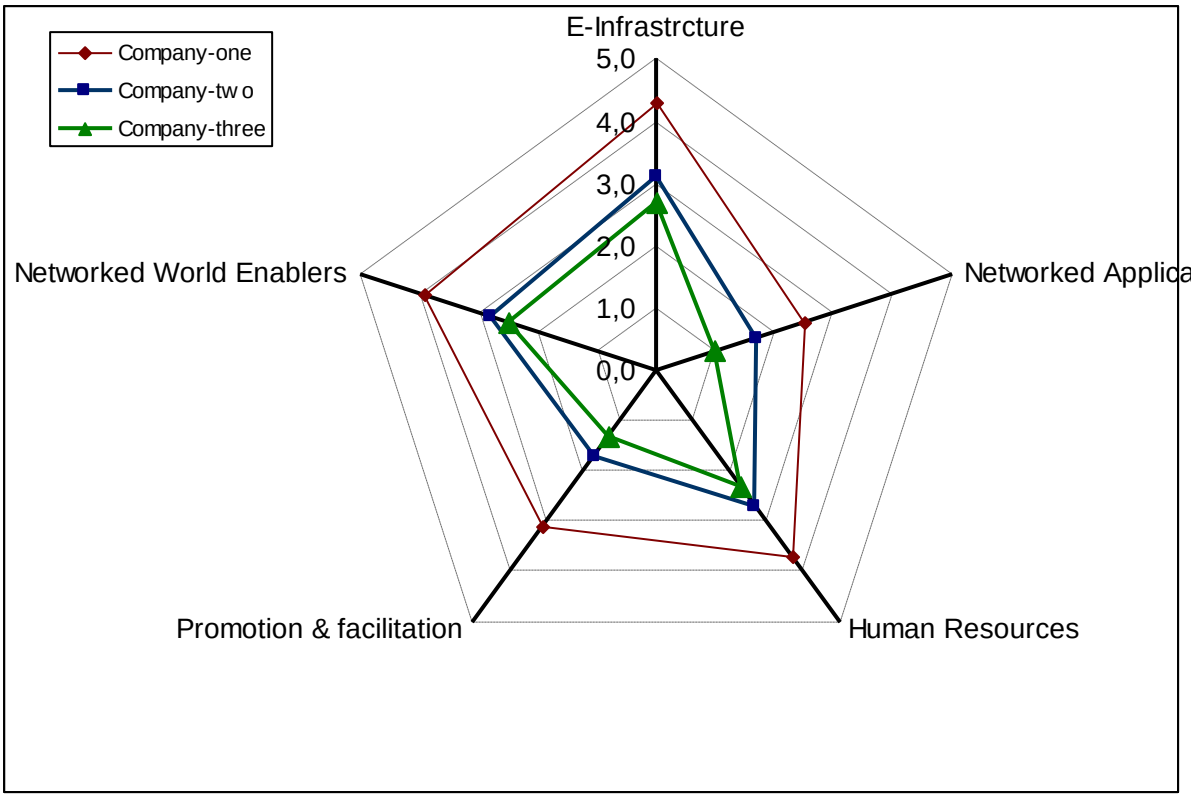
The revised questionnaire was used to examine three ICT Companies that had received three different levels of HCI ranking (strong, medium and weak).

RESULTS AND IMPLICATIONS

Figure-2 shown below summarizes the e-readiness measures of three ICT companies in Iran. Tables 1-6 shows responds from three ICT Companies that had received three different levels of HCI ranking; in tables 1-6, company-one is ranked strong, company-two is ranked medium and company-three is ranked weak.

The aim of this study is to design an e-readiness model for measuring e-readiness ICT companies in Iran and also to measure e-readiness of some of the companies. This research started with surveying the E-readiness assessment models of nations and small and medium-sized enterprises (SMEs) and then making a preliminary model. The model was revised based on the feedback from industry and due to experts' comments. Then, this model was used to examine e-readiness of three companies that are ranked at different levels; the results are as follows:

- Tables 1-6 reveal that there is a strong correlation between HCI ranking and e-readiness values obtained from the three companies; In overall measures, company-one, which is ranked as a strong company, scored 3.5 out of 5.0. Company-two, a medium ranked company, scored 2.4, and company-three, a company ranked as a weak company, scored 1.9. Similar differences are seen in other tables too, in measuring e-readiness scores based on dimensions.
- These three companies perform well on the "human resources" dimensions. This is obvious, as Iran has a vast pool of highly skilled workers.
- The companies also perform well on the "E-infrastructure" dimension. Perhaps, this is due to the fact that cost of ownership of technologies are becoming cheaper and enable painless penetration of ICT into companies of varying sizes and levels. Another reason for this phenomenon is perhaps increasing foreign investments in Iranian ICT sector.
- The company that rankled as strong had a high score on the "Networked enablers" (general business environment to conduct e-business), whereas the other two companies scored poorly. This can argued as though there is lack of public awareness and business policies and practices to conduct e-business in Iran, the strong companies are quick to adapt to the situation. Whereas,



weaker companies struggle to survive in the insecure environment.

- On the "Network Applications and Services" dimension, all three companies scored poorly. This simply means, as opposed to Western world, ICT companies in Iran are yet to offer high quality and competitive services, with the use of ICT.

Limitations of the study and future research:
This study only examined three ICT companies. Thus, it will be difficult to generalize the results for a general Iranian ICT companies.

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		Values of indices and dimensions	Weighted values	E- readiness and dimension readiness	Values of indices and dimensions	Weighted values	E- readiness and dimension readiness	Values of indices and dimensions	Weighted values	E- readiness and dimension readiness
		Company-one			Company-two			Company-three		
Overall Dimensions	E-infrastructure	4.279	0.86		3.139	0.631		2.72	0.546	
	Network applications and services	2.516	0.464		1.668	0.308		1.043	0.192	
	Human resource	3.765	0.777	3.543	2.671	0.551	2.415	2.281	0.47	1.981
	ICT Sector and the trade in ICT Goods	3.13	0.61		1.701	0.331		1.263	0.246	
	Networked World Enablers	3.901	0.833		2.783	0.594		2.46	0.525	

Table-1: Overall e-readiness values of three ICT companies

	Indices	Values of indices and dimensions	Weighted values	E- readiness and dimension readiness	Values of indices and dimensions	Weighted values	E- readiness and dimension readiness	Values of indices and dimensions	Weighted values	E- readiness and dimension readiness
		Company-one			Company-two			Company-three		
E-infrastructure	Firm's access to Fixed telephone	1	0.264		0.7	0.201		0.45	0.148	
	Firm's access to fax machines									
	Firm's access to computers	1	0.311		1	0.311		1	0.311	
	Firm's access to internet (Dial up, ISDN)	1	0.302		1	0.302		1	0.302	
	Firm's access to e-mail	1	0.309		0.65	0.223		0.45	0.173	
	Firm's access to Web Site	1	0.31		1	0.31		1	0.31	
	Firm's access to Wireless Communication	0.8	0.2		0.45	0.134		0.45	0.134	
	Firm's access to Local Area Networks (LAN)	0.95	0.286		0.95	0.286		0.95	0.286	
	Firm's access to Wide Area Networks (WAN)	0.8	0.19		0	0		0	0	
	Firm's access to Intranet Network	0.8	0.242		0.6	0.196		0	0	
	Firm's access to Extranet Network	0.8	0.229		0	0		0	0	
	Firm's access to EDI	0	0	4.279	0	0	3.139	0	0	2.72
	Remote access to the firm's computer network	0.85	0.189		0.1	0.06		0.1	0.06	
	Employee's access to Fixed telephone	0.4	0.121		0.2	0.084		0.2	0.084	
	Employee's access to computers	0.85	0.279		0.85	0.279		0.65	0.228	
	Employee's access to internet	0.85	0.258		0.85	0.258		0.65	0.211	
	Employee's access to e-mail	1	0.295		0.65	0.212		0.65	0.212	
	Employee's access to Wireless Communication	0.85	0.236		0.2	0.097		0.2	0.097	
	Firm's access to high-speed internet (Leased-Line, Wifi, xDSL)	0.85	0.256		0.55	0.187		0.45	0.163	

Table-2: E-readiness values of three ICT companies based on deminesion-1: e-infrastructure

	Indices	Values of indices and dimensions	Weighted values	E- readiness and dimension readiness	Values of indices and dimensions	Weighted values	E- readiness and dimension readiness	Values of indices and dimensions	Weighted values	E- readiness and dimension readiness
		Company-one			Company-two			Company-three		
Network applications and services	Firm's use of Supply Chain management	0.6	0.291	2.516	0.4	0.223	1.668	0	0	1.043
	Firm's use of Customer Relationship management	0.6	0.285		0.45	0.235		0.45	0.235	
	Firm's use of Enterprise Resource Planning	0	0		0	0		0	0	
	Firm's use of E-Purchase	0	0		0	0		0	0	
	Firm's use of E-Sale	0	0		0	0		0	0	
	Firm's use of Information Systems	1	0.444		1	0.444		0.45	0.248	
	Firm's use of Website maintenance containing management systems	0.85	0.338		0.85	0.338		0.8	0.322	
	Firm's use of E-Payment	0	0		0	0		0	0	
	Firm's use of e-exchange of documents	0.55	0.271		0.45	0.238		0.45	0.238	
	Firm's use of E-Marketing	0.65	0.307		0	0		0	0	
	Firm's use of E-Business	0.65	0.325		0	0		0	0	
	Information search									
	Firm's use of knowledge management applications	0.55	0.256		0.35	0.192		0	0	

Table-3: E-readiness values of three ICT companies based on deminesion-2: network applications

	Indices	Values of indices and dimensions	Weighted values	E- readiness and dimension readiness	Values of indices and dimensions	Weighted values	E- readiness and dimension readiness	Values of indices and dimensions	Weighted values	E- readiness and dimension readiness
		Company-one			Company-two			Company-three		
human resource	IT skilled workers in firm	High	0.517	3.765	High	0.517	2.671	Medium	0.387	2.281
	IT skilled consultants in firm	High	0.487		Medium	0.365		Medium	0.365	
	Number of IT workers with relevant educations	Medium	0.296		Low	0.197		Low	0.197	
	Number of employees familiar with IT concepts, usages and advantages	High	0.485		Medium	0.364		Medium	0.364	
	Number of managers familiar with IT concepts, usages and advantages	High	0.572		High	0.572		High	0.572	
	Duration of IT training	Medium	0.382		Low	0.254		very Low	0.127	
	Number of workers familiar with English language as a business prerequisite	Medium	0.402		Medium	0.402		Low	0.268	
	Human resource software applications	very High	0.625		not exist	0		not exist	0	

Table-4: E-readiness values of three ICT companies based on deminesion-3: human resources

	Indices	Values of indices and dimensions	Weighted values	E- readiness and dimension readiness	Values of indices and dimensions	Weighted values	E- readiness and dimension readiness	Values of indices and dimensions	Weighted values	E- readiness and dimension readiness
		Company-one			Company-two			Company-three		
ICT Sector and the trade in ICT Goods	Free partnership of foreign investors in e-business	Low	0.306	3.13	very Low	0.154	1.701	very Low	0	1.263
	Average income from ICT as a percentage of GDP	Low	0.287		Low	0.288		Low	0.288	
	ICT manufactured exports	Medium	0.421		very Low	0.141		very Low	0.141	
	Share of ICT value added in business sector's value added	Medium	0.425		Low	0.285		very Low	0.142	
	ICT cost									
	Utilizing new business models	very High	0.712		don't use	0		don't use	0	
	Utilizing new pricing models									
	Affordability of hardware and software	Medium	0.41		High	0.548		High	0.548	
	Cost savings in business process	High	0.569		Low	0.285		very Low	0.143	

Table-5: E-readiness values of three ICT companies based on deminesion-4: promotion & facilitation

	Indices	Values of indices and dimensions	Weighted values	E- readiness and dimension readiness	Values of indices and dimensions	Weighted values	E- readiness and dimension readiness	Values of indices and dimensions	Weighted values	E- readiness and dimension readiness
		Company-one			Company-two			Company-three		
Networked World Enablers	R&D costs in private sector	Medium	0.322		Medium	0.322		Low	0.215	
	Number of registered licensed software									
	level of security in IT (firewall, back up systems)	High	0.4		Medium	0.3		Medium	0.3	
	Accessibility to transparent and comprehensive policies in firms	High	0.42		Medium	0.315		Medium	0.315	
	Development of supervisory frameworks	High	0.402		Medium	0.301		Low	0.201	
	Familiarity level of Policy makers and business leaders with key connectedness policy	High	0.46		Medium	0.345		Medium	0.345	
	Policy makers and business leaders are working to ensure that new policies are in place to encourage and support the emergence of connectedness	Medium	0.35	3.901	Medium	0.35	2.783	Medium	0.35	2.46
	Competition of Internet Provider firms									
	Policy makers and business leaders' efforts to eliminate obstacles of connectedness	Medium	0.345		Medium	0.345		Low	0.23	
	Accessibility to the IT master plan in firms	very High	0.572		not exist	0		not exist	0	
	IT priority for top managers	very High	0.63		High	0.504		High	0.504	

Table-6: E-readiness values of three ICT companies based on deminesion-5: Positioning for the digital economy