E-business deployment in Iranian IT firms: an empirical research on recommendations

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Abstract: The present study is the first attempt to make recommendations that enhance e-business deployment in Iran. In this paper, studying 19 countries and four regions, 339 recommendations for e-business development are extracted. Then, using content analysis, 32 recommendations are selected and categorised into four groups of ‘e-infrastructure’, ‘human resource’, ‘security’ and ‘policies and plans’. Countries selected for extracting their recommendations are those whose circumstances resemble Iran’s. Therefore, these recommendations seem to be able to be exploited by developing countries, in particular, by Middle East countries. Finally, a survey is conducted and using statistical tests, the recommendations that are compatible with Iran’s internal circumstances are proposed. These recommendations are prioritised and categorised in three groups based on the criteria of the degree of importance in experts’ opinions,
country’s experience and whether or not the recommendations have been implemented in Iran. The proposed recommendations are also ranked according to experts’ opinions.

**Keywords:** e-business; policies; recommendations; Iran; information technology.


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1 **Introduction**

The growing importance and role of web-based technologies in supporting firm operations (e-business) is widely acknowledged both by practitioners (e-business reports
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have been published by all important consulting firms such as Forrester Group, Gartner Group, Morgan Stanley, KPMG, Accenture, etc.) and academics (e.g., Evans and Wurster, 1999). E-business continues to be of paramount importance in many organisations which increasingly conduct their business activities in the electronic environment (Goodridge, 2000). Less turn-around time, faster delivery of services, enhanced product selection, international competitiveness, a broader market reach, increased convenience for customers, reduced procurements costs, decreased average transaction costs, efficient purchasing processes, enhanced profitability, faster and limitless access to new customers and suppliers, increased depth of communication, information exchange and enhanced open standards are some advantages of e-business allowing start-up of small firms (Mutula and Van Brakel, 2006). Firms should come to recognise that their competitors are involved in e-business and if they did not take proper and prompt measures, they would begin to lose their competitive advantages. This situation would exert long-term impacts on firms (Rodgers et al., 2002). Executives and managers, on the other hand, should recognise the potential benefits of achieving e-business applications.

In transfer toward e-business, some firms may need to adopt new web-enabled business models such as auctioning off surplus goods, joining online purchasing cooperatives with competitors and online exchanges of information (Esiet and Stavreva, 2003). However, new ways of doing business, of course, involve taking risks (Statistics Netherlands, 2006). Similarly, successfully and beneficially adopting information and communication technology (ICT) is highly related to the innovative capabilities of firms and demands powerful management. Therefore, merging ICT into activities and operating through electronic channels requires an integrated and suitable plan based on firm readiness (Johnson and Johnson, 2005). One of the most appropriate ways to prepare the plan for utilising e-business is to exploit experiences of other countries. Policy makers, particularly in developing countries, encounter a chronic shortage of resources, so they had better exploit experiences of developed and developing countries and adopt successful methods peculiar to their own countries’ status quo. In doing so, they are able to avoid repeating previous mistakes and fetch the maximum return from minimal resource allocations [Organization for Economic Co-operation and Development (OECD), 2003; Bui et al., 2003]. Such experiences not only allow them to exploit the positive aspects of national policies but also help them obtain information on new ways of utilising e-business as well as solutions and best practices of other countries for supporting decision-making process (Monge and Chacón, 2002).

Like the majority of developing countries, Iran views information technology (IT) industry as a catalyst for resolving its problems and developing the country. During the past ten years, engineering services have been considered as a major area of non-oil products export since the idea of non-oil products export was presented as the country’s paramount priority. One of engineering services which has gained considerable attention is the export of IT products and particularly software products and services. As evidence to support such a claim, the amount of IT exports from Iran was around $50 million in fiscal year 2004 [Iranian Informatics Companies Association (IRICA), 2005]. Recent government plans for boosting ICT applications in Iran have had a direct positive impact on the market growth rate. Therefore, the market is growing at an average rate of 20 to 30% each year (IRICA, 2005). More than 2,000 IT firms are actively involved in this market. The rate by which new firms are established has increased considerably and is on par with the overall market growth rate. The IT industry of Iran employs over 100,000
people, but the rapid market growth has created a need for skilled IT professionals. Contrary to unemployment in most other industries in Iran, the IT industry is witnessing almost 100% employment for IT professionals. The need for skilled IT professionals has created a flourishing IT education market in which roughly 1,500 firms and institutions are actively participating. Since Iranian IT firms fulfill an important role in economic growth and in campaign against unemployment, various efforts have been channelled to ensure that they remain globally competitive. IT firms are revolutionising their business practices but need to do so at a faster rate in order to adjust to and cope with the many uncertainties and rapidly changing conditions. They must maintain their competitive edge, adopt new models of growth, develop a global network of product exchange and establish wider international network. Therefore, involvement in a networked economy or e-business is one of the new challenges facing IT firms today and has unfortunately left many firms behind in the race towards e-business deployment. If the IT industry lags behind in the new economy, the huge part of the country industry is left behind, as well.

In spite of enormous corporate interest and many successful efforts on e-business, there are few contextual studies on recommendations that improved its deployment in Middle East countries, particularly in Iran. In addition, prior studies on e-business focused primarily on the statistics and growth patterns of e-business in terms of usage across industries and countries located in EU, USA and the Far East (Eze and Gilbert, 2004). Similarly, Iran, like most Middle East countries, has carried out little empirical studies that determine improving recommendations of e-business deployment in firms. The purpose of the article, however, is to empirically contribute to the literature on e-business development in Iran by investigating recommendations that help e-business in Iranian IT firms. It is worth mentioning that in this article the dynamics of outsourced and in-house e-business applications in Iranian firms were taken into consideration. Therefore, the presented recommendations should be implemented by both firms and other sectors working with them – such as government – to boost e-business deployment in firms. These may provide some bases for additional future research that might address specific issues in e-business developments in firms from a comparative perspective. The proposed recommendations in this article were extracted from experiences and recommendations implemented for improving e-business in 19 countries and four regional groups. However, it should be noted that, while the experiences of other countries exploited for promoting e-business may fit in with a country’s specific conditions, but at the same time, they might not match another country’s situation. The focus of planning and analysis should centre on the ability of a country to support fundamental changes (Herman, 2000). In this paper, to tackle this problem and propose appropriate recommendations for promoting e-business in Iranian IT firms, a survey was conducted on the extracted recommendations of the previous studies. The recommendations were extracted from such countries’ experiences that their situations in cultural, social and economic conditions and ICT developments respect are similar to Iran. Therefore, these recommendations can be exploited by developing countries, in particular, the Middle East countries.

2 Literature review

In recent years, a surprising number of studies emerged in the management literature, trying to describe and better understand the e-business phenomenon. But, researchers and
practitioners have less attended to recommendations for promoting e-business. In this stage, some of these limited endeavours will be reviewed.

Surveying the attempts to identify recommendations reveals the fact that some countries like Canada, Poland, Australia, Hong Kong, etc., have identified and applied recommendations suitable to their own internal conditions to promote e-business (Allard and Anthony, 2003; Piątkowski, 2004; Australian Computer Society (ACS), 2002; Heung, 2003). For example, an exploratory study was conducted on investigating the barriers to implement e-commerce as considered by the travel agencies in Hong Kong. In this study, a mail survey was used to obtain the relevant data from 103 travel agencies (Heung, 2003). The findings indicate that Hong Kong travel agencies are mostly concerned about the ‘management support’ and ‘partner’s participation’ when they decide to implement e-commerce in the marketplace. Finally, in this study, implications of the findings were discussed and recommendations for future studies were included (Heung, 2003). In addition to the countries, some international organisations made a number of recommendations for improving e-business usage in their member countries. Some of these organisations are the OECD, the E-Business Policy Group (EBPG), the United Nations Conference on Trade and Development (UNCTAD), the Association of Southeast Asian Nations (ASEAN) and the Commonwealth (OECD, 2004; EBPG, 2002; Aho et al., 2004; UNCTAD, 2000; ASEAN, 2001; Grant et al., 2001).

The literature on extracting recommendations for promoting e-business reveals that practitioners and scholars have adopted one main approach. They first, evaluate the e-business readiness climate of the countries and then based on their assessment, make recommendations for improving status of their e-business readiness. The following can be cited as examples:

Fillis and his colleagues analysed a series of qualitative, in-depth interviews of owners/managers of smaller firms in central Scotland in order to test the research propositions (Fillis et al., 2004). Results of this research indicate that industry and sectoral factors play an important role in the level of e-business development achieved. Other important factors include the degree of entrepreneurial orientation of the key decision-maker and the ability to exploit appropriate competencies. In this study, recommendations for encouragement of e-business development were made and suggestions for future research were included (Fillis et al., 2004). Similarly, Allard and Anthony (2003) proposed growing Canada’s digital economy report. In this report, e-business readiness was assessed and then, recommendations for promoting e-business performance in Canada were identified. These recommendations are categorised in e-readiness, growth and acceleration, investment and image. Also, Piątkowski (2004) examined information society status in Poland from an analytical prospective. The main objective of his report is to provide a series of national monographs that study the potentialities towards aspects of information society such as e-business – related developments in Poland, including their positive and negative impacts. The studies carried out in Poland offer an assessment of its strengths and weaknesses regarding the development of information society and a view on their possible outcomes. The study concludes a set of alternative scenarios for the information society development. As another example, in order to suggest strategies for improving e-business development in Trinidad and Tobago, Macintyre and Ramnarine (2003) first assessed e-readiness of the country. They asserted that if these strategies were adopted appropriately, they could help to stimulate ICT use among the public and accelerate the e-economy.
In cited above studies, the researchers focused on e-business readiness climate in one country. But, in the study done by Papazafeiropoulou (2004), manifestation of the ‘digital divide’ between developed and non-developed countries in terms of the internet and e-commerce in the area of South Eastern Europe was examined. He used a framework developed by King et al. (1994) and examined the institutional actions pursued by regional policy makers. Finally, in this study, using a collective analysis, the ‘success factors’ in government intervention in supporting e-commerce diffusion and recommendations about good practices in policymaking were extracted (Papazafeiropoulou, 2004).

From another level of the e-business development, Jutla and his colleagues (2002) presented a conceptual model to be used by governments in creating and sustaining an appropriate climate that facilitates the national adoption of e-business (Jutla et al., 2002). This paper focuses specifically on the needs of small and medium-sized enterprises (SMEs); furthermore, it suggests six categories of e-business readiness metrics and measures to be used for assessing how well a country is performing in terms of providing a positive e-business readiness climate. Finally, this study provided examples of innovative initiatives from Canada, the Netherlands, Norway and Singapore. They conclude that a balance among attention to infrastructure components has not yet been achieved in these countries (Jutla et al., 2002). Furthermore, the work done by Liu et al. (2008) proposed a knowledge map platform to provide an effective knowledge support for utilising composite e-services by enterprises (Liu et al., 2008). In this study, a data mining approach was applied to extract knowledge patterns from the usage records of composite e-services. Based on the mining result, topic maps were employed to construct the knowledge map. Meanwhile, the proposed knowledge map was integrated with recommendation capability to generate recommendations for composite e-services via data mining and collaborative filtering techniques. A prototype system was implemented to demonstrate the proposed platform. The proposed knowledge map enhanced with recommendation capability in this research can provide users customised decision support to effectively utilise composite e-services (Liu et al., 2008).

In addition to the main approach to identifying the recommendations, some other countries made recommendations using best practices in promoting e-business. For example, the ACS in 2002 released ‘ICT development in Australia: a strategic policy review’ report in order to raise the level of debate among the key stakeholders and influencers (ACS, 2002). In this report, an ICT framework for the future is described. As an input to discussions, the ACS commissioned a review of policy reports in order to distil and synthesise the key strategic directions and policy suggestions emerging from previous analysis.

3 Extracting recommendations

In this stage, experiences and recommendations of different countries for promoting e-business were studied. Due to the limitations, all countries’ experiences and recommendations can not be examined here, so the following criteria are used to select countries:

- rankings of countries based on International Telecommunication Union (ITU) that divides countries into high, upper, medium and low e-ready countries (ITU, 2002):
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since Iran’s standing in this categorisation is medium, selected countries are among high, upper and medium ones.

- economic conditions: from each category of ITU rankings, countries with gross national income (GNI) closer to Iran are selected
- geographical conditions: from each continent, at least one country is selected
- accessibility to valid and up-to-date information about promoting e-business activities of the countries.

Considering mentioned-above criteria, the 19 countries were selected for studying:

India (Department of Information Technology (DIT), 2004), Belarus (National Academy of Sciences of Belarus, 2003), Egypt (Salem, 2002; El-Gabaly and Majidi, 2003), Malaysia (Rasool, 2003), Australia (ACS, 2002), Poland (Piątkowski, 2004), Argentina (Finquelievichy and Jara, 2000), Trinidad and Tobago (Macintyre and Ramarine, 2003), Costa Rica (Monge and Chacón, 2002), Srilanka (UNCTAD, 2000), Uzbekistan (State Committee for Science and Technology, 2001), United Arab Emirates (Shalhoub and Al Qasimi, 2003), Finland (Aho et al., 2004), Tunisia (UNCTAD, 2000), Canada (UNCTAD, 2000), Ireland (UNCTAD, 2000), Venezuela (UNCTAD, 2000), Peru (UNCTAD, 2000) and South Africa (UNCTAD, 2000). In addition, the activities of the ASEAN (2001), the Commonwealth (Grant et al., 2001), the Southern African Development Community (SADC) (2002) and the UNCTAD (2000) are also taken into account.

Studying these countries and regional groups, 339 recommendations that have been implemented in these countries were extracted. Using content analysis, a quantitative approach taken by counting the frequency of phenomena within a case in order to gauge its importance compared with other cases (Walliman and Baiche, 2001); then, the recommendations that have been implemented at least in two countries (at least with the frequency two) were selected as proposed recommendations to experts. The reason for selecting the frequency two is that the selected recommendations have been implemented and tested at least in two countries with different conditions. Due to the high number of these recommendations (32 recommendations), based on reviewing the literature, they were categorised into four groups to simplify the process of obtaining experts’ opinions. These categories include ‘e-infrastructure’, ‘human resource’, ‘security’ and ‘policies and plans’. They are defined as follows:

- **E-infrastructure**: deals with the technical and operational aspects of the e-business infrastructure. On the physical side, issues relating to the data networks, access channels, cost of access and hardware are addressed. The operational side deals with standards and interoperability framework issues (UNCTAD, 2000; National Academy of Sciences of Belarus, 2003; Monge and Chacón, 2002; World Economic Forum (WEF), 2002; OECD, 2004).

- **Human resource**: entails expanding ICT skills and developing ICT workforce and informing the society about e-business (Grant et al., 2001; UNCTAD, 2000; ACS, 2002; El-Gabaly and Majidi, 2003).

- **Security**: concerns modernising the legal framework and providing security and reliability for adapting to the rapidly changing e-environment (Statistics Netherlands, 2006; UNCTAD, 2000).
- **Policies and plans**: deals with policies and plans that government should enact to develop e-business (ASEAN, 2001; OECD, 2004; Grant et al., 2001).

The selected recommendations along with their frequencies and their dimensions are shown in Table 1.

4 **Methodology**

In this stage, to select appropriate recommendations for Iran’s internal situations from among those extracted earlier, a survey questionnaire was conducted. This questionnaire was developed based on the recommendations, which were frequently cited in different studies. It consists of two types of questions:

1. How important is the recommendation?
2. Has it been implemented yet or is it being implemented now in Iran?

Responses to the first type of the survey questions on the recommendations were entered on a five-point Likert-type scale with values ranging from one (strongly disagree) to five (strongly agree). The purpose of the second type of questions is to determine whether the recommendations have already been implemented or not, in Iran, so the responses were entered on a nominal scale with values, one (implemented) or zero (not implemented).

The data to test our recommendations comes from surveying 970 managers of Iranian IT firms, 155 faculty members and 237 managers of governmental organisations. In the case of the IT firms, they are identified as premier Iranian IT firms that have been able to create positive value operationally or financially. They were on the list available on the High Council of Informatics (HCI) website – the HCI is a government organisation that every year ranks Iranian IT firms in terms of the number of their employees and their annual income. The respondents to the survey are the decision makers or IT personnel of these firms who influence decision-making in investment in computerisation projects. The faculty members include those who hold a PhD in the fields related to ICT (computer engineering, electrical engineering, industrial engineering, IT engineering and management) and are awareness of e-business systems. Also, the governmental managers are those who influence the e-business development policies adopted by Iranian firms. All the respondents are expected to be knowledgeable of e-business systems.

Before the administration of the final survey, to ensure its validity and reliability, a random subset of ten respondents from among those described earlier was used for pilot testing. The respondents were asked to judge the degree to which they agreed with the devised items in the questionnaire. Fortunately, all of them took their time and reviewed the questionnaire meticulously. Their comments were taken into account and the questionnaire was revised for any potentially confusing items. Thus, the content validity of the questionnaire was incorporated into the survey questionnaire.

Finally, after gathering the responses, 354 usable responses were completed, producing a 26% response rate. Analysing the responses reveal that 42% of the participants are managers of IT firms, 21% of faculty members and 37% of governmental managers.

With respect to reliability, Cronbach alpha was computed for each dimension. Alfa coefficients for these two types of questions are 0.883 and 0.912, respectively. These
high estimates of reliability indicate that the internal convergence between questions, so the questionnaire has high reliability.

5 Data analysis

To select the most important recommendations based on experts’ opinions, analysing the usable responses, the following one-tailed *t*-test (p<0.05 and df = 253) was conducted for each recommendation. This test was conducted strictly so that the mean value will be considered as four.

\[ H_0: \mu = 4 \text{ against } H_a: \mu < 4 \]

Furthermore, to identify those recommendations, which have not been implemented in Iran, proportion test (p<0.05 and df = 253) was used as follow:

\[ H_0: p = 0.5 \text{ against } H_a: p > 0.5 \]

The results of *t*-test and proportion test are indicated in Table 1.

In this stage, the extracted recommendations from the previous stages were categorised based on different criteria and some analyses were done on them. First, using Scree test, the recommendations were classified based on the number of times used in different countries (their frequency in countries’ experiences). This method, proposed by Cattell, plots the successive frequency, which drop off sharply and then tend to level off (DIT, 2004). It suggests retaining all frequencies in the sharp descent before the first one on the line where they start to level off. Figure 1 illustrates the implementation of Scree test.

As it is clear from Figure 1, using Scree test, the recommendations are categorised into three groups:

- recommendations of high importance (with the frequency more than eight)
- recommendations of medium importance (with the frequency between six to eight)
- recommendations of low importance (with the frequency less than six)

![Figure 1](image-url)
<table>
<thead>
<tr>
<th>Dimension</th>
<th>Recommendation code</th>
<th>Extracted recommendation</th>
<th>Frequency</th>
<th>Results of t test</th>
<th>Results of proportion test</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Test statistic ($t_0$)</td>
<td>Lower-tail (-$t_0$)</td>
</tr>
<tr>
<td>Human resource</td>
<td>R1.1</td>
<td>Concentrating on developing ICT skills in individuals for developing the human resource IT skills in e-business</td>
<td>12</td>
<td>0.532</td>
<td>-1.67</td>
</tr>
<tr>
<td></td>
<td>R1.2</td>
<td>Informing the society about better opportunities provided by e-business</td>
<td>10</td>
<td>1.975</td>
<td>-1.67</td>
</tr>
<tr>
<td></td>
<td>R1.3</td>
<td>Enacting policies for training e-business systems professionals</td>
<td>7</td>
<td>-0.239</td>
<td>-1.67</td>
</tr>
<tr>
<td></td>
<td>R1.4</td>
<td>Encouraging a favourable business environment for provision of private e-business training services at a reasonable cost</td>
<td>6</td>
<td>-0.961</td>
<td>-1.67</td>
</tr>
<tr>
<td></td>
<td>R1.5</td>
<td>Helping colleges, universities and technical institutions by government and the private sector to develop and deliver coursework for students and affordable course extension programs for businesses on the internet business solutions</td>
<td>4</td>
<td>-5.013</td>
<td>-1.67</td>
</tr>
<tr>
<td></td>
<td>R1.6</td>
<td>Enacting supporting policies and programs to encourage people for using e-business</td>
<td>3</td>
<td>-1.266</td>
<td>-1.67</td>
</tr>
<tr>
<td></td>
<td>R1.7</td>
<td>Offering financial support by government to cover part of training expenses</td>
<td>3</td>
<td>-2.311</td>
<td>-1.67</td>
</tr>
<tr>
<td>Security</td>
<td>R2.1</td>
<td>Informing and using information security tools for firms in order to enhance the security in e-business</td>
<td>4</td>
<td>-0.516</td>
<td>-1.67</td>
</tr>
<tr>
<td></td>
<td>R2.2</td>
<td>Making security and reliability through properly informing methods and encoding technology</td>
<td>4</td>
<td>1.589</td>
<td>-1.67</td>
</tr>
<tr>
<td></td>
<td>R2.3</td>
<td>Joining the World Intellectual Property Organization (WIPO) and other international conventions</td>
<td>4</td>
<td>-1.725</td>
<td>-1.67</td>
</tr>
<tr>
<td></td>
<td>R2.4</td>
<td>Establishing a legal framework that is predictable and practical for domestic and cross-border transactions</td>
<td>6</td>
<td>1.223</td>
<td>-1.67</td>
</tr>
<tr>
<td>Dimension Code</td>
<td>Recommendation</td>
<td>Frequency</td>
<td>Test Statistic (T)</td>
<td>Lower-tail (-t_0)</td>
<td>H₀</td>
</tr>
<tr>
<td>---------------</td>
<td>--------------------------------------------------------------------------------</td>
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</tr>
<tr>
<td>R3,1</td>
<td>Establishing open and competitive telecommunication markets so that businesses can choose from among various technologies and services for access to the high-speed internet</td>
<td>12</td>
<td>-0.41</td>
<td>-1.67</td>
<td>accepting</td>
</tr>
<tr>
<td>R3,2</td>
<td>Improving and developing the telecommunication systems structure and information infrastructures to promote e-business activities</td>
<td>11</td>
<td>6.547</td>
<td>-1.67</td>
<td>accepting</td>
</tr>
<tr>
<td>R3,3</td>
<td>Promoting the accessibility of businesses to broadband</td>
<td>8</td>
<td>3.525</td>
<td>-1.67</td>
<td>accepting</td>
</tr>
<tr>
<td>R3,4</td>
<td>Enhancing effective competition and still stressing liberalisation in infrastructure, network services and applications across different technological platforms</td>
<td>8</td>
<td>-1.439</td>
<td>-1.67</td>
<td>accepting</td>
</tr>
<tr>
<td>R3,5</td>
<td>Providing a wide range of high quality internet and communication services at competitive prices for businesses</td>
<td>10</td>
<td>-2.281</td>
<td>-1.67</td>
<td>rejecting</td>
</tr>
<tr>
<td>R3,6</td>
<td>Encouraging investment in new technological infrastructure, content and applications</td>
<td>3</td>
<td>-1.235</td>
<td>-1.67</td>
<td>accepting</td>
</tr>
<tr>
<td>R3,7</td>
<td>Cooperating with industry associations and industry leaders to develop standardised sectoral digital exchanges that are scalable for use by businesses</td>
<td>3</td>
<td>-1.491</td>
<td>-1.67</td>
<td>accepting</td>
</tr>
<tr>
<td>R3,8</td>
<td>Making a proper technical infrastructure that provides a secure environment for e-business exchanges</td>
<td>2</td>
<td>1.306</td>
<td>-1.67</td>
<td>accepting</td>
</tr>
<tr>
<td>R3,9</td>
<td>Producing and developing the local content in the internet network and consequently in e-business</td>
<td>8</td>
<td>-4.731</td>
<td>-1.67</td>
<td>rejecting</td>
</tr>
<tr>
<td>R3,10</td>
<td>Constructing a powerful, modern, secure and reliable bank network for e-payments in e-business</td>
<td>4</td>
<td>6.238</td>
<td>-1.67</td>
<td>accepting</td>
</tr>
<tr>
<td>Dimension</td>
<td>Recommendation code</td>
<td>Extracted recommendation</td>
<td>Frequency</td>
<td>Frequency of recommendation</td>
<td>Results of t test</td>
</tr>
<tr>
<td>-----------</td>
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</tr>
<tr>
<td></td>
<td>R4,1</td>
<td>Adopting specific e-business practices by businesses to become part of supply chains (e.g., automobile manufacturing)</td>
<td>6</td>
<td>0.282</td>
<td>-1.67</td>
</tr>
<tr>
<td></td>
<td>R4,2</td>
<td>Enacting and developing the e-business regulations and monitoring their implementation</td>
<td>17</td>
<td>2.192</td>
<td>-1.67</td>
</tr>
<tr>
<td></td>
<td>R4,3</td>
<td>Developing affordable and effective redress mechanisms, such as online alternative dispute resolution (ADR), contributes to building trust among businesses and consumers</td>
<td>3</td>
<td>-5.174</td>
<td>-1.67</td>
</tr>
<tr>
<td></td>
<td>R4,4</td>
<td>Providing the incentives to banks for adopting and implementing common standards of international e-payment</td>
<td>3</td>
<td>0.895</td>
<td>-1.67</td>
</tr>
<tr>
<td>Policies and plans</td>
<td>R4,5</td>
<td>Establishing a committee or a special organisation for developing e-business and cooperating in national and international projects</td>
<td>3</td>
<td>-1.063</td>
<td>-1.67</td>
</tr>
<tr>
<td></td>
<td>R4,6</td>
<td>Providing financial and non-financial incentives to internal and external firms that invest in internal e-business</td>
<td>8</td>
<td>-1.837</td>
<td>-1.67</td>
</tr>
<tr>
<td></td>
<td>R4,7</td>
<td>Making working groups for policy-making in e-business taxation and legislation</td>
<td>2</td>
<td>-6.139</td>
<td>-1.67</td>
</tr>
<tr>
<td></td>
<td>R4,8</td>
<td>Encouraging firms to use e-business and realising its effects on company’s performance</td>
<td>2</td>
<td>1.975</td>
<td>-1.67</td>
</tr>
<tr>
<td></td>
<td>R4,9</td>
<td>Coordinating and organising e-business policies with business framework policies to enhance their effectiveness</td>
<td>2</td>
<td>-0.776</td>
<td>-1.67</td>
</tr>
<tr>
<td></td>
<td>R4,10</td>
<td>Reviewing the processes related to foreign commerce with the objective of enhancing the export volume via the internet and simplifying the activities related to e-business</td>
<td>3</td>
<td>0.891</td>
<td>-1.67</td>
</tr>
<tr>
<td></td>
<td>R4,11</td>
<td>Accounting on tools that emphasise commercial imperatives and focus on self-assessment of opportunities, benefits and costs of e-business</td>
<td>7</td>
<td>-0.403</td>
<td>-1.67</td>
</tr>
</tbody>
</table>

Table 1 (continued)
Table 2 shows the categorisation of the recommendations based on their frequency in different countries.

<table>
<thead>
<tr>
<th>Categorisation</th>
<th>Recommendation code</th>
</tr>
</thead>
<tbody>
<tr>
<td>High</td>
<td>R1,1 - R1,2 - R3,1 - R3,2 - R3,5 - R4,2</td>
</tr>
<tr>
<td>Medium</td>
<td>R1,3 - R1,4 - R2,4 - R3,3 - R3,4 - R3,9 - R4,1 - R4,6 - R4,11</td>
</tr>
<tr>
<td>Low</td>
<td>R1,5 - R1,6 - R1,7 - R2,1 - R2,2 - R2,3 - R3,6 - R3,7 - R3,8 - R3,10 - R4,3 - R4,4 - R4,5 - R4,6 - R4,9 - R4,10</td>
</tr>
</tbody>
</table>

According to Table 2, the recommendations of e-infrastructure were implemented and attended by many countries for their e-business development, so that three recommendations R3,1, R3,2 and R3,5 are in level of high importance (with the frequency more than eight). These countries urge that for improving of e-business usage in addition to having a developed telecommunication systems structure and information infrastructures, telecommunications services providers market should be open and competitive. In such a market, the costs of access to telecommunication services are low and their quality is high. Another group of recommendations that were emphasised by countries are those related to the individuals’ perception, knowledge and skills concerning in e-business. For continuous promoting of e-business usage in a country, people should be informed of opportunities and advantages brought about by e-business systems and acquire the skills in using them. These recommendations are indicated in Tables 1 and 2 with codes R1,1, R1,2. Another main element of e-business development is the legal policies and frameworks of ICT that directly and indirectly affect the use of e-business in countries. Obsolete laws and weak enforcement of creation, maintenance, and dissemination of information make an inconvenient environment for e-business. If policies and procedures are in support of e-business, the return of investment will be higher. Thus, codifying up-to-date laws and appropriate policies create a proper environment for e-business and improve e-business usage. Therefore, here, the countries notify the role of the governments in providing an appropriate environment for electronic transactions with recommendation R4,2.

Table 3 Rankings of the proposed recommendations

<table>
<thead>
<tr>
<th>Code</th>
<th>Mean</th>
<th>Rank</th>
<th>Code</th>
<th>Mean</th>
<th>Rank</th>
<th>Code</th>
<th>Mean</th>
<th>Rank</th>
</tr>
</thead>
<tbody>
<tr>
<td>R3,2</td>
<td>4.65</td>
<td>1</td>
<td>R3,8</td>
<td>4.17</td>
<td>9</td>
<td>R2,1</td>
<td>3.93</td>
<td>17</td>
</tr>
<tr>
<td>R3,10</td>
<td>4.63</td>
<td>2</td>
<td>R2,4</td>
<td>4.17</td>
<td>10</td>
<td>R4,9</td>
<td>3.9</td>
<td>18</td>
</tr>
<tr>
<td>R3,3</td>
<td>4.5</td>
<td>3</td>
<td>R4,4</td>
<td>4.17</td>
<td>11</td>
<td>R1,4</td>
<td>3.83</td>
<td>19</td>
</tr>
<tr>
<td>R4,2</td>
<td>4.3</td>
<td>4</td>
<td>R4,5</td>
<td>4.13</td>
<td>12</td>
<td>R4,5</td>
<td>3.83</td>
<td>20</td>
</tr>
<tr>
<td>R1,2</td>
<td>4.27</td>
<td>5</td>
<td>R4,1</td>
<td>4.1</td>
<td>13</td>
<td>R3,6</td>
<td>3.83</td>
<td>21</td>
</tr>
<tr>
<td>R4,8</td>
<td>4.27</td>
<td>6</td>
<td>R1,3</td>
<td>4.03</td>
<td>14</td>
<td>R1,6</td>
<td>3.8</td>
<td>22</td>
</tr>
<tr>
<td>R1,1</td>
<td>4.21</td>
<td>7</td>
<td>R4,11</td>
<td>4.03</td>
<td>15</td>
<td>R3,4</td>
<td>3.8</td>
<td>23</td>
</tr>
<tr>
<td>R5,2</td>
<td>4.21</td>
<td>8</td>
<td>R3,1</td>
<td>3.93</td>
<td>16</td>
<td>R3,7</td>
<td>3.79</td>
<td>24</td>
</tr>
</tbody>
</table>
For a variety of advantages, businesses are resorting to e-business to provide transactions online, on one hand, but time, financial and human resources limitations, on the other hand, require us to prioritise the proposed recommendations for implementation in Iran – recommendations that are important based on experts’ opinions. Hence, these recommendations were ranked based on the average of the degree of importance accorded in experts’ opinions. The rankings of the proposed recommendations are shown in Table 3.

The results of prioritising e-business development recommendations in experts’ opinions are:

- One of the most important dimensions affecting the e-business is e-infrastructure. The World Bank expresses that widely accessible, affordable and reliable ICT infrastructure must form the foundation of any ICT development strategy (World Bank, 2005). Without ubiquitous infrastructure, the benefits of ICTs will accrue to only the few people who have access to communications networks, most often the better off. In addition, the majority of national e-strategies entail elements that focus on developing a country’s ICT infrastructure, in particular, on broadening access. The experts reach consensus on this issue in a way that three recommendations with highest priorities for e-business development are in this dimension (R3,2, R3,10 and R3,3).

- E-business improvement is affected by macro policies and plans of the country (WEF, 2002). ‘Enacting and developing the ICT regulations and monitoring their implementation’ and ‘encouraging firms to use e-business and realising its effects on company’s performance’ are of important recommendations in this dimension in experts’ opinions.

- For using new ICTs, individuals should receive trainings, attain required skills, be aware of the benefits of these technologies and be encouraged to use them. The lack of proper advertising and informing plan in the society makes the great potential of these technologies inactive and unusable.

- Using electronic equipment in transactions and businesses is in its initial stages in Iran and we are not in a situation that security issues cause concern for us. The absence of security recommendations in the first seven recommendations acknowledges this reality.

According to the above-mentioned discussions, it reveals that e-business development needs the improvement of all affecting aspects not only on one aspect. To enhance e-business in a society, in addition to constructing infrastructures required for accessibility to electronic tools, an informing plan is needed to motivate individuals and businesses to use such tools. Both of these issues rely on the appropriate macro policies and plans enacted for e-business development.

Finally, a general categorisation of the recommendations was done based on the three following criteria: experts’ opinions, their frequency in different countries and whether or not the recommendations have been implemented in Iran before. General categorisation is displayed in Figure 2.
Based on the three criteria discussed earlier, the recommendations can be categorised as:

**Type 1** these recommendations are those with frequency one in countries, so they were dropped from the set of recommendations and were not considered in the survey.

**Type 2** this type involves those recommendations that have been implemented in Iran but experts consider them as highly important; therefore, it is essential to evaluate their implementation and make required modifications. In evaluating the implementation of these recommendations, the priority is given to those whose high or medium importance in countries’ experiences has been recognised.

**Type 3** this type refers to recommendations that are regarded as significant in experts’ opinions and countries’ experiences and have not been implemented in Iran before. It is necessary to implement these recommendations that are in urgent need of implementation.

**Type 4** these recommendations are viewed as important in experts’ opinions, have medium importance in countries’ experiences and have not been implemented in Iran before. Although implementation of these recommendations seems necessary, Type 3 recommendations have priority over them.
Type 5 recommendations concern those recommendations to which significance is attached by expert, have low importance in countries’ experiences and have not been implemented in Iran before. They are peculiar to Iran and are given low priority compared with Type 4 recommendations.

Types 6 and 7 recommendations are those to which importance is ascribed by expert and high or medium importance in countries’ experiences, respectively. These recommendations have no priority for implementation but can be implemented in certain cases. In this paper, they were not considered as proposed recommendations, either.

Type 8 recommendations are those to which significance is concerned with those that are not of any significance in experts’ opinions, of low importance in countries’ experiences and have no priority for implementation.

In this article, Types 3, 4 and 5 recommendations were proposed to promote e-business. Table 4 illustrates the general categorisation for each recommendation.

Table 4: The general categorisation for each recommendation

<table>
<thead>
<tr>
<th>General categorisation</th>
<th>Recommendation code</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>( R_{1,3} - R_{3,4} )</td>
</tr>
<tr>
<td>3</td>
<td>( R_{1,1} - R_{1,2} - R_{3,1} - R_{3,2} - R_{4,2} )</td>
</tr>
<tr>
<td>4</td>
<td>( R_{1,4} - R_{2,4} - R_{3,3} - R_{4,1} - R_{4,11} )</td>
</tr>
<tr>
<td>5</td>
<td>( R_{1,6} - R_{2,2} - R_{3,6} - R_{3,7} - R_{3,8} - R_{3,10} - R_{4,4} - R_{4,5} - R_{4,8} - R_{4,9} - R_{4,10} )</td>
</tr>
<tr>
<td>6</td>
<td>( R_{3,5} )</td>
</tr>
<tr>
<td>7</td>
<td>( R_{3,6} - R_{4,6} )</td>
</tr>
<tr>
<td>8</td>
<td>( R_{1,5} - R_{1,7} - R_{2,3} - R_{4,3} - R_{4,7} )</td>
</tr>
</tbody>
</table>

6 Conclusions and implications for practice

The intensity of competition among IT firms increase with every new technological application and therefore, it is imperative for firms’ practitioners to be cognizant of the fact and prepare their firms for the business challenges of the next decade of 21st century. In essence, although the competitive use of e-business is permeating all businesses today, firms that are more sophisticated and aggressive in deploying and using advanced e-business systems would be able to keep up with the competition if not gain competitive advantage. The pressure to provide unique and acceptable services and products at reduced costs means increased deployment of e-business innovations even in traditionally low information and knowledge intensive sectors.

The purpose of this article is to extract recommendations that enhance e-business deployment in developing countries, particularly in Iran. This research draws upon previous innovation research on recommendations for improving e-business and corroborates some of the findings of these studies indicated earlier (e.g., the importance of e-infrastructure and human resources in improving e-business use). The article identifies four significant dimensions of enhancing e-business development in developing countries. They are ‘e-infrastructure’, ‘human resource’, ‘security’ and ‘policies and plans’. Since countries selected for extracting their recommendations are those whose
internal circumstances resemble Iran’s, the outcome of this article would be critical for the IT firms in developing countries in general and in Iran, in particular as they plan further investments in e-business systems. By applying the proposed recommendations, firms could successfully improve key areas in the environment, in the enterprise and related e-business issues necessary to enable effective and functional firms within the country and at the international level.

The outcome of this article will also be useful to the Iranian government and its agencies. All the economic sectors of Iran recognise government’s role in facilitating e-business deployment, however, existing regulatory policies are at best inadequate and less comprehensive to enable the complex dynamic legal and structural frameworks needed to, successfully allow maximum business use of e-business innovation. In this regard, the Iranian Government is in urgent need of working closely with the private sector to implement the presented recommendations in ‘policies and plans’ dimension for enhancing e-business usage in firms.

Finally, this article contributes to e-business literature and creates additional poll of resources practitioners and academics could use to further enrich and extend their knowledge of the evolving phenomenon. Empirical data on e-business development and growth in Iran is a small step, nonetheless, toward enhancing and extending the discussion on e-business as a global platform for business, economic and industrial activities.

6.1 Limitations and future research

Our study suffers from a number of limitations: first, the response rate was nearly low so the power of the study may not be high. Second, the local survey involved representatives of national chains. Although managers of the IT firms are knowledgeable about IT processes supporting their operations, their IT expertise level may not be like that of IT professionals. Third, this study incorporates the IT firms listed and ranked by the HCI; as a result, the recommendations of the managers of unranked firms on the HCI list were inevitably dropped. Future research can consider both ranked and unranked firms, even though it is difficult to obtain such data due to the lack of accessibility.

References


