Future analysis to define guidelines for Iran's e-commerce: scenario planning

Fooziye Shaykhzade

Future analysis to define guidelines for Iran's e-commerce: scenario planning

Fooziye Shaykhzade

West University of Timisoara (UVT),
Bulevardul Vasile Pârvan 4, Timișoara, Romania
Email: fooziye.shaykhzade10@e-uvt.ro

Abstract: E-commerce has created a new era in market competition according to speed, efficiency, cost reduction and utilising every opportunity. The present study was carried out to define the possible scenarios of Iran's e-commerce on the Vision of 2025. A sample of managers and experts was chosen. First, using a fuzzy Delphi method, ten key uncertainties were identified. Second, different possible states of key uncertainties were created the cross-impact balance analysis matrix. Third compatible scenarios were recognised by using Scenario Wizard software. The results showed that three scenarios were identified as follows: flourishing, realistic and bad luck. The most constructive scenario is called the flourishing scenario, the most feasible scenario is called the realistic scenario, and the defeatist scenario is the bad luck scenario. After analysing the identified scenarios, practical strategies were provided; they enable companies to reduce the unexpected consequences of future changes and prepare them to benefit from future opportunities. In an international context, developing countries with similar political and national barriers can benefit from these strategies.

Keywords: e-commerce; electronic commerce; futurology; scenario planning; Vision 2025; Iran.

Biographical notes: Fooziye Shaykhzade is a PhD candidate in the field of Marketing at the West University of Timisoara and holds an MBA in General Business. She has high interest in social media field studies such as online marketing, social media marketing, e-commerce, and marketing management. She has experience as a sales and marketing manager in ICT/IT Field. She has skilled in B2B, international marketing, B2B marketing, online marketing, social media marketing, and sales management.

1   Introduction

Information technology (IT) plays a vital role in the universe's countries' strategic policies and economic, political and social vicissitudes. Also, it is a crucial tool to remove the barriers of traditional challenges in the informatics areas, communications, cultural development, and commercial and scientific-commercial exchanges, especially in developing countries; additionally, it affects whole aspects of a human being's life. Iran

got 82nd place in the ranking of IT development index among 152 countries in 2015; in the meanwhile, South Korea got 1st place, and the 152nd place went to Chad; in comparison with countries like UAE, Qatar, Bahrain, KSA, Turkey and Oman; Iran has not got a satisfying level in IT (International Telecommunication Union, 2015). IT has created many facilities in different areas in scientific, social and economic fields. Access to the net is one of its most essential indexes. The internet has had remarkable progress recently and has caused a revolution in economic, social, business behaviour, training, learning, etc. in most counties around the world (Haque et al., 2009; Shaykhzade and Alvandi, 2020). With the entrance of information and communication technology (ICT) and exclusively the internet to the world of business and economy, a revolution – which has been named e-commerce – has occurred (Choshin and Ghaffari, 2017). Chaffey et al. (2019) has defined e-commerce as the action of buying and selling through the internet. In this way of doing business, purchasing and selling or exchanging products, services, and information happens through computer and telecommunications networks such as the internet. Up to now, different business models have been presented in e-commerce; for instance, the most important ones are B2B, B2C, B2G, C2B, C2C, G2G and M2C. However, B2C has many interactions between the firms and end users in e-commerce. There are no precise statistics about e-commerce in Iran, but we can find statistics in the online section (Shaparak online payment sys.); with the assumption that all transactions in Shaparak system are equivalent for B2C, the volume of e-commerce in 2017 is more than 20,000,000,000.00 USD; this number is more than 11% of gross domestic product (GDP) in Iran. Based on Iran E-commerce Development Center's reports, this percentage need 20% in developed countries. Iran E-commerce Development Center has predicted that the volume of e-commerce might reach 28,250,000,000.00 USD (15% of GDP) in 2018 (E-commerce Development Center, 2017). E-commerce advantages include the globalisation of economic institutions, omitting time and space limitations, product price reduction for customers, increasing sales volume and providing better customer service (Asterki and Hashemi, 2012). In order to this fact, the Iran Government has started to develop e-commerce (Saghafi et al., 2015). The business environment is changing; thus, firms must survive, adapt to all these changes and use change management (Nikabadi and Hakaki, 2018). Additionally, the traditional business has no place in the new era, and it cannot fulfil the new needs of humans, so according to human new demands in the business, nowadays using the internet and moving forward to e-commerce by firms are tools to reach competitive advantages for the companies (Sebora et al., 2009). Santarelli and D'Altri (2003) realised that e-commerce helps small and medium-sized businesses (SMBs) to increase their customers, develop their market share, and improve their customer relation management (CRM). Also, Johnston et al. (2007) have presented that e-commerce has caused an increase in revenue and cost reduction in most European and North American firms. The increasing number of new technologies in ICT and e-commerce made commercial activities face an unstable, complex and vague atmosphere. Also, traditional business models are no longer practical, and managers should increase their knowledge of the business future and predict the radical changes in a business environment to prevent potential future risks and threats (Rohrbeck et al., 2015). Because any unexpected disorder in the environment can lead a firm or even an industry to collapse; according to this fact, knowledge about the future is a necessary factor in preventing risks and unexpected threats also; effective decision-making is

another vital factor and can lead to e-commerce in a favourable direction (Qi and Tapio, 2018). So future planning is essential to get a better perception of changes in the path to e-commerce; although in the process of planning, we can use information and experiences of the past but focusing on the past can make firms neglect future changes; because the future always contains uncertainties and here the importance of futurology is revealed (Saghafi et al., 2015). Futurology is a set of attempts, and it contains data mining, patterns mining, and investigating of the stable and unstable factors to create potential futures and plan for them; the planning process contains recognition, observation, uncertain factors interpretation, and it causes changes in competitive conditions also it helps firms to decrease the uncertainties of future (Qi and Tapio, 2018; Rohrbeck and Schwarz, 2013). Scenario planning is one of the future study methods which has been used to define strategies for different areas such as gas and oil (Amini et al., 2015), regional development (Zali, 2009), and portfolio design for investment companies (Hanafizadeh et al., 2011). In this study, we initially try to define the uncertainties and success factors to create the scenarios of Iran's e-commerce future according to Vision 2025. After analysing the identified scenarios, practical strategies are provided based on the experts' opinions' for each scenarios; they enable companies able to reduce the unexpected consequences of future changes. Thus, most of the possible shocks and amazement will decrease, and the results of this study will help managers manage the situations better and more proficiently.

This study focused on Iran's e-commerce as a case study. Iran is considered a developing country with unique international and national conditions. From the national aspect, Iran is a very controlled society, these limitations influence the overall cultural norms, and from the political and international point of view, Iran is under sanctions which cause trade barriers, lack of latest technology transfer and economic difficulties. These aspects are considered in five main dimensions (Hakaki and Nikabadi, 2022) while doing the library studies. These political and socio-economic conditions affect the future of e-commerce in Iran. This study can be considered a path analysis. The results of this study can be used as a guide for other countries with similar situations, such as developing countries and Middle Eastern countries. All of the previously mentioned strategies can be useful for them.

The subsidiary goals of this study are:

1   To determine the key factors of Iran's e-commerce.

2   To determine the critical uncertainties of Iran's e-commerce.

3   To create feasible scenarios and select the most appropriate one among them.

2   Literature review

2.1   E-commerce

The internet has allowed users to find their requested information, access computers from afar, and send e-mails; its simplicity made it a fast-growing phenomenon (McCabe, 2001). For instance, Firdausy and Fernanda (2021) stated that e-commerce is overgrowing in Indonesia.

One internet usage is e-commerce which has created an enormous change in business behaviour and has many business interactions (Devaraju, 2016). Also, it has changed most of the economic systems (Wang et al., 2017). There is no fixed definition for e-commerce, so there are indeed definitions equal to the researchers of this era. In 1998, one of the first studies on e-commerce defined e-commerce as buying and selling information, service, and product through computer networks such as the internet (Awa et al., 2015). Organization for Economic Cooperation and Development (OECD) defined e-commerce as the action of doing business through the internet, whether products and services can be delivered online or not (Coppel, 2000). E-commerce created a new area in market competition because of speed, efficiency, and cost reduction; furthermore, it utilised the potential chances of doing a business. E-commerce changed the ways of selling, buying or doing a deal with customers or suppliers and changed the business perspective from the best production to more attention to CRM (Yang et al., 2015).

To sum up, all the mentioned descriptions for e-commerce have one thing in common: e-commerce is doing business (buying, selling or exchanging products, services and information) through computer networks such as the internet (Sarode, 2015). Some crucial advantages of e-commerce are the firm's globalisation, omitting time and space limitations, product price reduction for customers, increasing sales volume, and providing better customer service. Of course, same as all new technologies, e-commerce also has disadvantages, such as the unknown impacts of e-commerce on human social commerce, the lack of law and legal rules, cultural changes, and the elimination of firms with traditional business models from the market (Asterki and Hashemi, 2012). Also, based on the studies, there are many elements for e-commerce satisfaction, such as increasing efficiency (Hong and Kim, 2002), perceived security (Chang and Chen, 2009), system and service quality (Ahn et al., 2007), information quality (Schaupp et al., 2009) and customer satisfaction (Wang et al., 2011).

2.2 Scenario planning

Futurology is a set of attempts containing data mining, patterns mining, and investigating the stable and unstable factors to define potential futures; scenario planning is one of the methods researchers use for futurology studies (Toolayi, 2014; Puglisi, 2012). Scenario planning is a fiction description of an event's possible conditions or the occurrence of events through time; scenario planning is a tool to create plans, reduce the level of uncertainties and increase the level of knowledge about ongoing or upcoming events; also it helps the decision makers to reach a better decision (Tapio et al., 2017; Ratcliffe, 2000; Keseru et al., 2021; Seyitoğlu and Costa, 2022; Ravetz et al., 2021). In addition, scenario planning can be an essential tool in long-term strategic programs (Tapio et al., 2017). Lindgren and Bandhold (2003) stated that there is no unique definition for scenario planning; different scientists provided different definitions. For instance, Porter (1985) defined scenario planning as an internal, compatible observation which can turn to the future; Schwartz (1991) has described scenario planning as a tool to regularise a person's perception of feasible future states which a person can make a better decision based on these states; Moreover, Ringland defined scenario planning as that part of strategic planning related to future uncertainties management (Lindgren and Bandhold, 2003).

**Table 1**　The related studies to futurology in e-commerce and related areas

Title	Country	Researcher(s)/year	Outcomes
Weak signals and wild cards leading to transformative disruption: a consumer Delphi study on the future of e-commerce in China	China	Qi and Tapio (2018)	Using the Delphi method besides considering the future of e-commerce, 27 factors were identified as critical factors (a quantitative-qualitative study).
The challenges and opportunities of e-commerce in India: future prospective	India	Devaraju (2016)	Investigating the future trend of e-commerce defined the most important opportunities of it as follows: the existence of too many alternatives for customers, cost reduction of inventory and distribution, product globalisation, changing in firm's market share.
An investigation of the impact of effective factors on the success of e-commerce in small-and medium-sized companies	Iran	Choshin and Ghaffari (2017)	A case study of 180 members of post bank which indicated the important factors on e-commerce as customer satisfaction, costs, infrastructures, information and knowledge.
Future of e-commerce in India challenges & opportunities	India	Sarode (2015)	Effective factors which influence the future of e-commerce in India have identified as follows: the number of internet users, improving the living standards, the number of smartphone users, competitive prices, product variety in online markets, online startups.
Determinant factors of e-commerce adoption by SMEs in developing country: evidence from Indonesia	Indonesia	Rahayu and Day (2015)	The effective factors on adopting e-commerce can be categorised into 4 groups as follows: 1　technical and technological 2　human resources 3　environmental factors 4　human factors.
E-Commerce 2025 – Delphi-based scenario & trend analysis for the future of digital commerce	Germany	Terbeck (2014)	4 scenarios have been defined in this study based on the uncertainties of lifestyle and technology immersion.
Modelling hybrid demand (e-commerce "+" traditional) evolution: a scenario planning approach	Switzerland	Canetta et al. (2013)	A quantitative model to predict the e-c commerce's demand in 2 levels (market level and operation level) has been identified.
E-commerce and privacy: exploring what we know and opportunities for future discovery	Review article	Boritz and No (2011)	The results show that attention to privacy is more important than other factors (firms, customers, government, beneficiaries) in e-commerce.
Identifying the possible future scenarios of e-government services according to Horizon 2025	Iran	Saghafi et al. (2015)	8 scenarios have been identified based on 6 uncertainties.

Scenario planning is a qualitative approach to decision making, and it is used when the main variables are not easy to evaluate; scenario planning contains creating logical stories about the possible futures, and it aims to recognise and assess the possible circumstances, uncertainties, threats and opportunities (Canetta et al., 2013; Alessandri et al., 2004). A scenario is a practical response to the question 'What may happen?' so it differs from prediction and perspective; although both try to reduce risks, scenario planning makes risk management possible (Lindgren and Bandhold, 2003). The experimental literature review is shown in Table 1.

3 Research methodology

The present study is practical based on the purpose of the research and consists of qualitative variables; it also categorises as descriptive research and it is performed as a survey in three stages (Figure 1).

Figure 1 Research stages
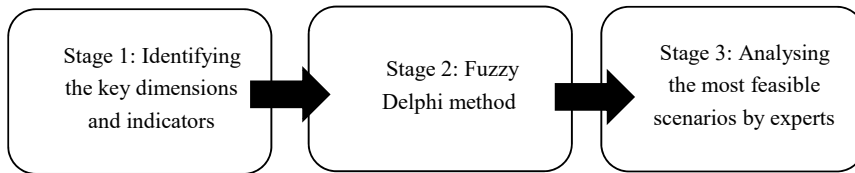
3.1 First stage

3.1.1 Identifying the key dimensions and indicators

In this stage, the key dimensions and indicators were determined after the topic was defined and the researchers decided on the scenarios' time visions (Miller and Waller, 2003). These factors and driving forces have the most effect on the defined topic. In order to define these key dimensions and indicators, library studies have been done in a wide range, such as books, papers, and national and international dissertations (Table 2).

In this stage, a questionnaire containing three questions for each factor has been made. The factors were extracted from library studies (Table 2). This questionnaire is going to examine the existence of the factor's impact in Iran, and if the answer is yes in the second place, it is going to measure the impact of key factors and uncertainties of the driving forces by using 1–5 Likert-scale (very high, high, medium, low and very low). After academic experts confirmed the questionnaire's appearance and content validity, the questionnaire was distributed among the sample.

3.1.2 Identifying the key uncertainties

After collecting data, a Delphi fuzzy method was used to define the key uncertainties. The Delphi method is used as a tool to eliminate the anonymous judgements of experts. The fuzzy Delphi method removes experts' judgements by using a series of data collection and different analysis techniques distributed with the feedback; this method is a vital tool for incomplete knowledge about an issue or a problem (Jafari et al., 2008).

The fuzzy Delphi method that is employed in this paper was proposed by Chang et al. (2000). All the scores have been changed to fuzzy triangular numbers to find the key uncertainties, according to Table 3 for the non-functional factors (0, 0, 0) have been considered.

Table 2   Key factors and driving forces

Dimensions	Indicators	Code	Researcher(s)-year
Technology	Hardware facilities	T_1	Qi and Tapio (2018), Choshin and Ghaffari (2017), Rahayu and Day (2015), Awa et al. (2015), Sarode (2015), Terbeck (2014), Radfar and Ghazaei (2014), Sajadi Amiri et al. (2012)
	Software facilities	T_2	
	Internet speed and broadband	T_3	
	Creating the penetration rate by ISP	T_4	
	Providing information security	T_5	
Organisation	Organisational structure	O_1	Choshin and Ghaffari (2017), Rahayu and Day (2015), Fahimi (2016), Toolayi (2014), Sajadi Amiri et al. (2012)
	Organisational strategy	O_2	
	Planning	O_3	
	Process reengineering	O_4	
	Organisational flexibility	O_5	
	Organisational tendency	O_6	
	Change's speed	O_7	
	Senior managers' support	O_8	
	Human resources' skill	O_9	
Back up institutions	Banking network	S_1	Fahimi (2016), Radfar and Ghazaei (2014), Toolayi (2014), Sajadi Amiri et al. (2012)
	Stock exchange	S_2	
	Customs	S_3	
	Suppliers	S_4	
	Software and hardware producers and websites	S_5	
Environment	Legal issues	E_1	Qi and Tapio (2018), Choshin and Ghaffari (2017), Rahayu and Day (2015), Awa et al. (2015), Terbeck (2014), Fahimi (2016), Saghafi et al. (2015), Radfar and Ghazaei (2014), Sajadi Amiri et al. (2012)
	Government support (according to sanctions)	E_2	
	Customer knowledge of e-commerce	E_3	
	People's e-commerce trust	E_4	
	Market factors (customer, competition, distribution)	E_5	
	Cultural factors	E_6	
Costs	Hardware costs	C_1	Qi and Tapio (2018), Fahimi (2016), Choshin and Ghaffari (2017), Awa et al. (2015), Sarode (2015), Terbeck (2014), Fahimi (2016), Sajadi Amiri et al. (2012)
	Software costs	C_2	
	Data centre and network setting-up costs	C_3	
	Maintenance	C_4	
	Internet access costs	C_5	
	Human resources training	C_6	
	Society training	C_7	

Table 3 Triangular fuzzy number equivalent of Likert-scale

Likert-scale	Very low	Low	Medium	High	Very high
Triangular fuzzy number	(0, 0, 0.25)	(0, 0.25, 0.5)	(0.25, 0.5, 0.75)	(0.5, 0.75, 1)	(0.75, 1, 1)

In order to aggregate the experts (sample) opinions, the fuzzy mean method has been applied [equation (1)]. Then, to defuzzify them, equation (2) has been used. Finally, factors with a threshold higher than 0.6 (Habibi et al., 2014) for both impact and uncertainty have been recognised as key uncertainties.

$$F\ ave = \frac{\sum_{i=1}^{i=n} l_i}{n}, \frac{\sum_{i=1}^{i=n} m_i}{n}, \frac{\sum_{i=1}^{i=n} u_i}{n} = (L, M, U) \tag{1}$$

$$Crisp = \frac{L + M + U}{3}. \tag{2}$$

3.2 Second stage

To study the impact network among the possible states of the defined key factors on Iran's e-commerce future, the researchers have used Scenario Wizard software and adopted the cross-impact balance analysis method. "Cross-impact methods are standard tools of the scenario technique. They provide several structured processes for the deduction of plausible future developments in the form of rough scenarios and are based on expert judgments about systemic interactions" [Weimer-Jehle, (2006), p.334]. At this level, experts will score and define the CIB matrix for the crossed effects between the key uncertainties. Then, the CIB matrixes components will convert to fuzzy triangular numbers (shown in Table 4).

Table 4 Equivalents

The amount and type of influence's verbal equivalent	Crisp equivalent	Triangular fuzzy equivalent
Strong booster	+2	(0.75, 0.9, 1)
Weak booster	+1	(0.5, 0.75, 0.9)
Neutral	0	(0.3, 0.5, 0.75)
Weak limiter	−1	(0.1, 0.3, 0,5)
Strong limiter	−2	(0, 0.1, 0.3)

To conclude the experts' opinions, the fuzzy mean method was applied [equation (1)]. Then, to defuzzify them, equation (2) was used. Finally, Scenario Wizard software has generated and analysed a CIB matrix. Using the CIB matrix, scenarios have been created.

3.3 Third stage

In this stage, the optimistic, pessimistic and most feasible scenarios were selected among the scenarios created by Scenario Wizard software; then, a group of experts discussed and defined strategies based on the selected scenarios.

3.3.1 *Statistical population and sample*

According to expert oriented fuzzy Delphi method, the statistical population of the present study is a group of managers and experts with at least a master's degree and ten years of job experience in the e-commerce field (Hakaki et al., 2021). According to the experts' opinions, the IT technical leaders with more than ten years of experience in Iran have observed the technology evolution. They were engaged and adapted to the changes made in traditional services during the years and the new generation of start-ups and online businesses. Regarding the usage of the Delphi method to analyse data in the study and to have a panel of related experts, based on Habibi et al. (2014), 7 to 10 experts are enough. Table 5 shows the six members of the sample demographic information. Sample members were chosen by snowball and purposing sampling method.

Table 5   Sample demographic information

	Expert no. 1	*Expert no. 2*	*Expert no. 3*	*Expert no. 4*	*Expert no. 5*	*Expert no. 6*
Education	PhD	PhD	Master's degree	PhD	Master's degree	PhD
Job experiences	13 years	15 years	12 years	10 years	11 years	13 years

4   Results

The present study aims to recognise the feasible scenarios of Iran's e-commerce based on the Vision of 2025. A wide range of library studies have been performed, and the result was to extract 32 factors influencing Iran's e-commerce future in five critical dimensions (Hakaki and Nikabadi, 2022): technology, organisation, backup institutions, environment and costs. After recognising the initial factors by using six experts' opinions based on two variables (impact and uncertainty level) and Delphi fuzzy method, the key uncertainties have been recognised. Figure 2 shows the uncertainty-impact of 32 indicators.

Figure 2   Iran's e-commerce uncertainties-driving forces matrix (see online version for colours)
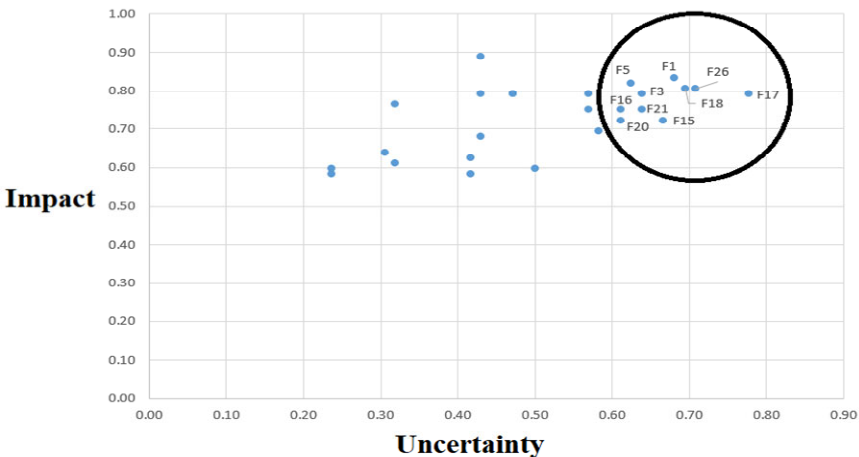
According to Figure 2, among the 32 identified factors (library studies), ten indicators have got 0.6 scores (impact and uncertainty) and have been identified as key uncertainties. Table 6 shows the final list of key uncertainties. Here, new codes are applied to them to become easier to analyse.

Table 6 Key uncertainties

	Code in questionnaire	*Key uncertainties*	*Influence*	*Uncertainty*
1	F1	Hardware facilities	0.83	0.68
2	F3	Internet speed and broadband	0.79	0.64
3	F5	Providing information security	0.82	0.63
4	F15	Banking network	0.72	0.67
5	F16	Stock exchange	0.75	0.61
6	F17	Customs	0.79	0.78
7	F18	Suppliers	0.81	0.69
8	F20	Legal issues	0.72	0.61
9	F21	Government support (according to sanctions)	0.75	0.64
10	F26	Hardware costs	0.81	0.71

Table 7 Analytical structure of key uncertainties

Descriptor			*Variant*
A	Hardware facilities	A1	Increase
		A2	Decrease
B	Internet speed and broadband	B1	Increase
		B2	Stable
		B3	Decrease
C	Providing information security	C1	Increase
		C2	Decrease
D	Banking network	D1	Support
		D2	Lack of support
E	Stock exchange	E1	Boom
		E2	Bust
F	Customs	F1	Support
		F2	Lack of support
G	Suppliers	G1	Increase
		G2	Decrease
H	Legal issues	H1	Stability
		H2	Instability
I	Government support (according to sanctions)	I1	Increase
		I2	Decrease
J	Hardware costs	J1	Increase
		J2	Decrease

Table 8   Final CIB matrix

		A		B			C		D		E		F		G		H		I		J	
		A1	A2	B1	B2	B3	C1	C2	D1	D2	E1	E2	F1	F2	G1	G2	H1	H2	I1	I2	J1	J2
A	A1	▨	▨	2	0	−1	1	1	0	1	1	0	1	1	0	0	0	−1	2	−1	0	−1
	A2	▨	▨	−1	0	1	1	−1	0	1	0	0	1	1	0	0	0	0	−1	−1	−1	0
B	B1	2	2	▨	▨	▨	0	0	−1	0	0	0	0	0	−1	−1	0	0	1	0	0	0
	B2	0	−1	▨	▨	▨	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	B3	−1	1	▨	▨	▨	−1	0	1	−1	0	0	0	0	−1	1	0	0	−1	−1	−1	−1
C	C1	1	1	0	0	0	▨	▨	2	1	1	0	0	−1	2	2	2	−1	−1	0	−1	0
	C2	1	−1	−1	0	−1	▨	▨	−1	0	0	0	0	0	−2	−1	−1	−1	0	−1	0	−1
D	D1	0	0	−1	0	0	2	−1	▨	▨	2	0	2	0	2	−1	2	−1	−1	−1	−1	0
	D2	1	1	0	0	−1	−1	0	▨	▨	−1	0	−1	0	−1	−1	−1	−1	0	−1	0	0
E	E1	1	0	0	0	−1	−1	−1	2	−1	▨	▨	1	0	−1	−1	−1	−1	−1	0	0	0
	E2	0	0	−1	0	0	0	0	−1	1	▨	▨	0	0	1	1	−1	−1	0	−1	0	−1
F	F1	1	1	0	0	0	−1	0	1	−1	1	0	▨	▨	0	0	2	0	−1	−1	−1	0
	F2	1	−1	0	0	0	0	0	−1	1	0	0	▨	▨	0	−1	−1	−2	−1	0	−1	−1
G	G1	−1	1	0	0	0	1	0	2	−2	−1	−1	2	−1	▨	▨	2	2	0	−1	−1	−1
	G2	1	0	0	0	−1	−1	0	2	2	0	0	−1	−1	▨	▨	−2	2	−1	0	−1	−1
H	H1	0	0	0	0	2	−1	−1	−1	−1	−1	−1	−1	−1	2	1	▨	▨	−2	0	−1	−1
	H2	1	1	0	0	0	0	2	2	1	−1	−1	−2	0	−2	0	▨	▨	−2	2	−1	−1
I	I1	0	0	0	0	0	0	−1	−1	−1	2	−1	−1	−1	0	−1	0	0	▨	▨	−1	0
	I2	0	0	0	0	0	−1	−1	−1	−1	0	−1	0	−1	−1	0	0	0	▨	▨	−1	0
J	J1	−1	−1	1	0	0	−1	−1	−1	−1	0	−1	−1	−1	−1	2	0	0	−2	2	▨	▨
	J2	2	0	0	0	0	−1	1	1	−1	−1	0	−1	−1	1	−1	0	0	1	−1	▨	▨

After identifying the key uncertainties (Table 6), a set of variants showing the descriptors' different states, have been gathered. These variants were used to study the impact network among the feasible future states of Iran's e-commerce according to Vision 2025. These variants have figured the CIB matrixes. Table 7 shows the variants and descriptors.

After collecting the experts' opinions, a Delphi fuzzy method has been adopted to form the final CIB matrix in Scenario Wizard software. Table 8 shows the final CIB matrix.

The final CIB matrix has been analysed by Scenario Wizard software, and three scenarios have been created after assessing the compatible gained scenarios. Table 9 shows the final scenarios.

Table 9 The final compatible scenarios

		Scenario no. 1		*Scenario no. 2*		*Scenario no. 3*	
A	Hardware facilities	A1	Increase	A2	Decrease	A1	Increase
B	Internet speed and broadband	B1	Increase	B3	Decrease	B1	Increase
C	Providing information security	C2	Decrease	C2	Decrease	C1	Increase
D	Banking network	D2	Lack of support	D2	Lack of support	D1	Support
E	Stock exchange	E2	Deflation	E2	Deflation	E1	Boom
F	Customs	F2	Lack of support	F2	Lack of support	F1	Support
G	Suppliers	G2	Decrease	G2	Decrease	G1	Increase
H	Legal issues	H2	Instability	H2	Instability	H1	Stability
I	Government support (according to sanctions)	I2	Decrease	I2	Decrease	I1	Increase
J	Hardware costs	J1	Increase	J1	Increase	J2	Decrease

Source: Made by Scenario Wizard

Compatible scenarios are recognised. In this stage, the compatible scenarios have been assessed to define the optimistic, pessimistic, and most possible scenarios. Table 10 shows the results of determining the optimistic and pessimistic states for variants of each descriptor.

Furthermore, according to these optimistic and pessimistic states, each scenario has a score (Table 10).

Based on Table 10, Scenario no. 3 is the most optimistic scenario, which has named the 'flourishing scenario', Scenario no. 1 has defined as the most feasible scenario, and it is named the 'realistic scenario', and the last one is named the 'bad luck scenario'. Scenario no. 2 is the most pessimistic scenario.

Table 10   The optimistic and pessimistic states of scenarios

	Hardware facilities	Internet speed and broadband	Providing information security	Banking network	Stock exchange	Customs	Suppliers	Legal issues	Government support (according to sanctions)	Hardware costs	Impact score	Optimistic (O)	Pessimistic (P)
1	Increase (o)	Increase (o)	Decrease (p)	Lack of support (p)	Deflation (p)	Lack of support (p)	Decrease (p)	Instability (p)	Decrease (p)	Increase (p)	43	2	8
2	Decrease (p)	Decrease (p)	Decrease (p)	Lack of support (p)	Deflation (p)	Lack of support (p)	Decrease (p)	Instability (p)	Decrease (p)	Increase (p)	61	0	10
3	Increase (o)	Increase (o)	Increase (o)	support (o)	Boom (o)	support (o)	Increase (o)	Stability (o)	Increase (o)	Decrease (o)	80	10	0

5   Discussion and conclusions

Qi and Tapio (2018) investigated the future of e-commerce in china by using a Delphi method, and they identified 27 critical factors; Devaraju (2016) studied the challenges and opportunities of e-commerce in India and defined the most significant opportunities of it as follows: the existence of too many alternatives for customers, cost reduction of inventory and distribution, product globalisation and changing in firm's market share; furthermore, Choshin and Ghaffari (2017) investigated the impact of e-commerce in SMBs in Iran, and they indicated the critical factors on e-commerce as customer satisfaction, costs, infrastructures, information and knowledge; Sarode (2015) stated the effective factors which influence the future of e-commerce in India are the number of internet users, improving the living standards, the number of smartphone users, competitive prices, product variety in online markets and online start-ups. Also, the effective factors of adopting e-commerce can be categorised into four groups as follows: technical and technological, human resources, environmental factors and human factors (Rahayu and Day, 2015). Terbeck (2014) has defined four scenarios based on the uncertainties of lifestyle and technology immersion in Germany, while a quantitative model to predict the e-commerce's demand at two levels (market level and operation level) has been identified by Canetta et al. (2013). Boritz and No (2011) identified that attention to privacy is more important than other factors (firms, customers, government, beneficiaries) in e-commerce. In the e-government field, Saghafi et al. (2015) identified eight scenarios based on six uncertainties. The present study was performed to define guidelines for the future of Iran's e-commerce based on the social, economic, political and Vision 2025 program. A group of experts provided the guidelines and the strategies provided in this section based on their opinions and directions. All the experts are managers of top e-businesses in Iran.

Scenario no. 1, which has been named the 'realistic scenario', is formed based on hardware facilities increase, internet speed and broad band increase, information security decrease, banking network's lack of support, stock exchange deflation, customs support, suppliers decrease, laws instability, government support decrease (according to sanctions), and hardware costs increase. After investigating the obtained results by experts, it is recognised that the outcomes are very close to upcoming conditions. Because of the exchange rate, inflation and returning international sanctions even after the Joint Comprehensive Plan of Action, the country's economic situation is fragile. It caused problems in international trade and increased the price of hardware, equipment and other commercial goods. In the meantime, using illegal ways made the law more unstable. According to government financial issues and the lack of a banking network and government support, many problems have been created for active firms in the e-commerce field.

Thus, the strategies below are provided according to Vision 2025 to strengthen the firms and help them survive in e-commerce:

1   Appropriate subsidy allocation by the government and banking facilities with low-interest rates.

2   Supplying the raw materials and critical components of e-commerce infrastructure.

3   Removing the commercial barriers such as the elimination or reduction of customs costs and tax.

4   Encouraging the market to exchange goods through e-commerce.

5   Increasing the standards and technical capabilities.

6   Increasing the planning and comprehensive coordination in order to reach
     e-commerce.

7   Training urban and rural populations about the benefits of using the online markets
     and services.

Scenario no. 2, named the 'bad luck scenario', is very similar to the realistic scenario.
The differences between these two scenarios are in two points. In Scenario no. 1, there
are reduced hardware facilities and internet speed and broadband decrease, which are the
main results of international sanctions.

    The following strategies have been suggested to pass these conditions and reach a
proper place in e-commerce according to Vision 2025:

1   The active firms in the e-commerce area need the ultimate support to reach the
     highest performance. Supporting them by more financial incentives such as tax
     exemptions to increase the capacity and promote the existing technologies, reducing
     the customs' costs to import the required materials and equipment, and allocating
     low-interest loans.

2   Prioritising the unfinished start-ups instead of initiating new ones. The government
     can cover some parts of the expenses for these unfinished start-ups or allocate
     low-interest loans, purchase guaranteed contracts, and grant the unfinished projects
     to the developers in exchange for at least a 5% down payment with long-term
     instalments.

3   Considering more financial incentives (such as tax reduction) for sellers and buyers
     who use or import domestic goods.

4   Eliminating taxes and cooperation of governmental organisations with active firms in
     e-commerce, for instance, Iran Post Company's cooperation with companies like
     Digikala, Bamilo and Missland.

5   Free space allocation to firms in order to reduce their expenses

Scenario no. 3 named the 'flourishing scenario', is formed based on hardware facilities
increase, internet speed and broad band increase, information security increase, banking
networks support, stock exchange boom, customs support, suppliers increase, laws
stability, government support increase (according to sanctions), and hardware costs
decrease.

    After investigating the obtained results by experts, the following strategies have been
presented to boost and simplify the path to e-commerce in Vision 2025:

1   The implementation of e-commerce in different areas with high technology and
     standards.

2   Developing internal capacities in order to produce hardware and equipment. To
     reach this strategy, the government can have contracts with international producers
     and cooperate and transfer knowledge.

3 Considering financial incentives such as tax or tariff reduction, this can apply to either importing the required equipment and hardware for developing e-commerce or exporting and importing through electronic channels.

4 Providing proper conditions to attract foreign investors.

5 Contracts with international organisations for monitoring e-commerce.

6 Improving the performance of e-commerce websites and firms.

7 Replacing the old equipment with new ones.

8 Modifying business models, especially in manufacturing organisations.

9 Encouraging the employees to have better teamwork due to making the whole organisation implement e-commerce.

10 Training e-commerce to employees.

11 Offering better bank and government facilities to newcomer companies in the e-commerce field.

This study focused on Iran's e-commerce as a case study. Iran is considered a developing country with unique international and national conditions. From the national aspect, Iran is a very controlled society, these limitations influence the overall cultural norms, and from the political and international point of view, Iran is under sanctions which cause trade barriers, lack of latest technology transfer and economic difficulties. These aspects are considered in five main dimensions while doing the library studies. These political and socio-economic conditions affect the future of e-commerce in Iran. This study can be considered a path analysis. The results of this study can be used as a guide for other countries with similar situations, such as developing countries and Middle Eastern countries. All of the previously mentioned strategies can be useful for them.

Based on research limitations and the interviews with experts, the following items have been suggested for future research:

1 R&D studies to improve the domestic capabilities and produce the requested hardware.

2 Investigating the methods to increase the efficiency of active firms in e-commerce, such as control systems and fuzzy decision-making systems.

3 Investigating the cause-and-effect relationships of the recognised effective Iran e-commerce's future key factors by using the fuzzy DEMATEL method.

4 Prioritising the key factors affecting the future of e-commerce according to ISM.

References

Ahn, T., Ryu, S. and Han, I. (2007) 'The impact of web quality and playfulness on user acceptance of online retailing', *Information & Management*, Vol. 44, No. 3, pp.263–275.

Alessandri, T.M., Ford, D.N., Lander, D.M., Leggio, K.B. and Taylor, M. (2004) 'Managing risk and uncertainty in complex capital projects', *The Quarterly Review of Economics and Finance*, Vol. 44, No. 5, pp.751–767 [online] https://doi.org/10.1016/j.qref.2004.05.010.

Amini, H., Bonyadi Naeini, A. and Pshvayi, M.S. (2015) 'Iran's oil and gas sector scenario planning under sanctions: key uncertainties and the analysis of interactions approach', *Tomorrow's Management Research Journal*, in Persian, Vol. 14, No. 45, pp.85–98.

Asterki, M. and Hashemi, M.R. (2012) 'E-commerce: advantages and disadvantages', *Regional Computer Science Conference*, Computer Engineering and Information Technology, Dorood Islamic Azad University, in Persian, June.

Awa, H.O., Awara, N.F. and Lebari, E.D. (2015) 'Critical factors inhibiting electronic commerce (EC) adoption in Nigeria: a study of operators of SMEs', *Journal of Science & Technology Policy Management*, Vol. 6, No. 2, pp.143–164.

Boritz, J.E. and No, W.G. (2011) 'E-commerce and privacy: exploring what we know and opportunities for future discovery', *Journal of Information Systems*, Vol. 25, No. 2, pp.11–45.

Canetta, L., Cheikhrouhou, N. and Glardon, R. (2013) 'Modelling hybrid demand (e-commerce "+" traditional) evolution: a scenario planning approach', *International Journal of Production Economics*, Vol. 143, No. 1, pp.95–108.

Chaffey, D., Edmundson-Bird, D. and Hemphill, T. (2019) *Digital Business and e-Commerce Management*. Pearson UK.

Chang, H.H. and Chen, S.W. (2009) 'Consumer perception of interface quality, security, and loyalty in electronic commerce', *Information & Management*, Vol. 46, No. 7, pp.411–417.

Chang, P.T., Huang, L.C. and Lin, H.J. (2000) 'The fuzzy Delphi method via fuzzy statistics and membership function fitting and an application to the human resources', *Fuzzy Sets and Systems*, Vol. 112, No. 3, pp.511–520.

Choshin, M. and Ghaffari, A. (2017) 'An investigation of the impact of effective factors on the success of e-commerce in small-and medium-sized companies', *Computers in Human Behavior*, January, Vol. 66, pp.67–74.

Coppel, J. (2000) *E-Commerce: Impacts and Policy Challenges*, OECD Economics Department Working Papers, No. 252, OECD Publishing, Paris.

Devaraju, P. (2016) 'The challenges and opportunities of e-commerce in India: future prospective', *International Journal of Engineering and Computer Science*, Vol. 5, No. 11, pp.19065–19069.

E-commerce Development Center (2017) *Annual Report of E-commerce Development Center* [online] http://www.ecommerce.gov.ir (accessed 5 January 2021).

Fahimi, M.A. (2016) *Future Analysis of E-commerce in Afghanistan-Case Study – The Usage of E-commerce in Importing Dry Fruit*, Dissertation, in Persian, University of Tehran.

Firdausy, C.M. and Fernanda, M. (2021) 'The effects of sales promotion, attractiveness of internet advertising, and website quality on impulse buying of consumers of Tokopedia in Indonesia', *International Journal of Management and Enterprise Development*, Vol. 20, No. 1, pp.34–48.

Habibi, A., Ezadyar, S. and Sarafrazi, A. (2014) *Fuzzy MCDM*, in Persian, Katibeh Gil Press, Rasht.

Hakaki, A. and Nikabadi, M.S. (2022) 'A hybrid fuzzy approach to success in e-commerce adoption in Iranian manufacturing SMEs', *Asian Academy of Management Journal*, Vol. 27, No. 1, pp.175–197.

Hakaki, A., Nikabadi, M.S. and Heidarloo, M.A. (2021) 'An optimized model for open innovation success in manufacturing SMES', *RAIRO – Operations Research*, Vol. 55, No. 6, pp.3339–3357.

Hanafizadeh, P., Kazazi, A. and Jalili Bolhasani, A. (2011) 'Portfolio design for investment companies through scenario planning', *Management Decision*, Vol. 49, No. 4, pp.513–532 [online] http://doi.org/10.1108/00251741111126468.

Haque, A., Khatibi, A. and Mahmud, S.A. (2009) 'Factors determinate customer shopping behaviour through internet: the Malaysian case', *Australian Journal of Basic and Applied Sciences*, Vol. 3, No. 4, pp.3452–3463.

Hong, K.K. and Kim, Y.G. (2002) 'The critical success factors for ERP implementation: an organizational fit perspective', *Information & Management*, Vol. 40, No. 1, pp.25–40.

International Telecommunication Union (2015) *Measuring the Information Society*, Switzerland, Geneva.

Jafari, A., Jafarian, M., Zareei, A. and Zaerpour, F. (2008) 'Using fuzzy Delphi method in maintenance strategy selection problem', *Journal of Uncertain Systems*, Vol. 2, No. 4, pp.289–298.

Johnston, D.A., Wade, M. and McClean, R. (2007) 'Does e-business matter to SMEs? A comparison of the financial impacts of internet business solutions on European and North American SMEs', *Journal of Small Business Management*, Vol. 45, No. 3, pp.354–361.

Keseru, I., Coosemans, T. and Macharis, C. (2021) 'Stakeholders' preferences for the future of transport in Europe: participatory evaluation of scenarios combining scenario planning and the multi-actor multi-criteria analysis', *Futures*, March, Vol. 127, p.102690.

Lindgren, M. and Bandhold, H. (2003) *Scenario Planning*, Palgrave, London.

McCabe, D.B. (2001) *Online and Offline Decisions: The Effect of Product Category and Order of Information*, Arizona State University.

Miller, K.D. and Waller, H.G. (2003) 'Scenarios, real options and integrated risk management', *Long Range Planning*, Vol. 36, No. 1, pp.93–107.

Nikabadi, M.S. and Hakaki, A. (2018) 'A dynamic model of effective factors on open innovation in manufacturing small and medium sized companies', *International Journal of System Dynamics Applications (IJSDA)*, Vol. 7, No. 1, pp.1–26.

Porter, M.E. (1985) 'Technology and competitive advantage', *Journal of Business Strategy*.

Puglisi, M. (2012) *The Study of the Futures: An Overview of Futures Studies Methodologies*, pp.445–454, SURF (Centre for Sustainable Urban and Regional Futures) [online] http://om.ciheam.org/om/ pdf/a44/02001611.pdf (accessed 25 January 2021).

Qi, Y. and Tapio, P. (2018) 'Weak signals and wild cards leading to transformative disruption: a consumer Delphi study on the future of e-commerce in China', *World Futures Review*, Vol. 10, No. 1, pp.54–82.

Radfar, R. and Ghazaei, H. (2014) 'The feasibility of deploying e-commerce in the heavy machinery industry and providing improvement solutions case-study: Hepco Company', *First International Conference on Economics, Management, Accounting and Social Sciences*, Rasht, in Persian, June.

Rahayu, R. and Day, J. (2015) 'Determinant factors of e-commerce adoption by SMEs in developing country: evidence from Indonesia', *Procedia – Social and Behavioral Sciences*, July, Vol. 195, pp.142–150.

Ratcliffe, J. (2000) 'Scenario building: a suitable method for strategic property planning?', *Property Management*, Vol. 18, pp.127–144 [online] https://doi.org/10.1108/02637470010328322.

Ravetz, J., Neuvonen, A. and Mäntysalo, R. (2021) 'The new normative: synergistic scenario planning for carbon-neutral cities and regions', *Regional Studies*, Vol. 55, No. 1, pp.150–163.

Rohrbeck, R. and Schwarz, J.O. (2013) 'The value contribution of strategic foresight: insights from an empirical study of large European companies', *Technological Forecasting and Social Change*, Vol. 80, No. 8, pp.1593–1606.

Rohrbeck, R., Battistella, C. and Huizingh, E. (2015) 'Corporate foresight: an emerging field with a rich tradition', *Technological Forecasting and Social Change*, December, Vol. 101, pp.1–9.

Saghafi, F., Ali Ahmadi, A., Ghazi Noori, S. and Hoorali, M. (2015) 'Identifying the possible future scenarios of e-government services according to Horizon 2025', *Information Technology Management*, in Persian, Vol. 7, No. 1, pp.49–68.

Sajadi Amiri, M., Sorayayi, A. and Sajadi Amiri, A. (2012) 'The feasibility of setting up e-commerce in export agents of Mazandaran-using AHP fuzzy method', *Journal of Management*, in Persian, Quarterly, Vol. 9, No. 26, pp.43–56.

Santarelli, E. and D'Altri, S. (2003) 'The diffusion of e-commerce among SMEs: theoretical implications and empirical evidence', *Small Business Economics*, Vol. 21, No. 3, pp.273–283.

Sarode, R.M. (2015) 'Future of e-commerce in India challenges & opportunities', *International Journal of Applied Research*, Vol. 1, No. 12, pp.646–650.

Schaupp, L.C., Bélanger, F. and Fan, W. (2009) 'Examining the success of websites beyond e-commerce: an extension of the IS success model', *Journal of Computer Information Systems*, Vol. 49, No. 4, pp.42–52.

Schwartz, P. (1991) *The Art of The Long View: Planning for the Future in an Uncertain World*, Currency Doubleday, New York.

Sebora, T.C., Lee, S.M. and Sukasame, N. (2009) 'Critical success factors for e-commerce entrepreneurship: an empirical study of Thailand', *Small Business Economics*, Vol. 32, No. 3, pp.303–316.

Seyitoğlu, F. and Costa, C. (2022) 'A systematic review of scenario planning studies in tourism and hospitality research', *Journal of Policy Research in Tourism, Leisure and Events*, pp.1–18.

Shaykhzade, F. and Alvandi, M. (2020) 'Investigating the effects of interaction satisfaction and interaction immersion in social media on customer value creation', *International Journal of Internet Marketing and Advertising*, Vol. 14, No. 3, pp.258–274.

Tapio, P., Rintamäki, H., Rikkonen, P. and Ruotsalainen, J. (2017) 'Pump, boiler, cell or turbine? Six mixed scenarios of energy futures in farms', *Futures*, April, Vol. 88, pp.30–42.

Terbeck, H. (2014) *E-Commerce 2025 – Delphi-based Scenario & Trend Analysis for the Future of Digital Commerce*, Master's thesis, University of Twente.

Toolayi, R. (2014) 'Using a Delphi method to future analysis the trends of social media services in the process of technology globalization', *Journal of Strategic Studies of Globalization*, in Persian, Vol. 5, No. 14, pp.93–123.

Wang, L., Chai, Y. and Liu, Y. (2017) 'Analysis of e-commerce transaction system's division of labor based on essential services quantity', *International Journal of Crowd Science*, Vol. 1, No. 3, pp.197–209.

Wang, Y., Zhao, X. and Qiao, M. (2011) 'Customer satisfaction evaluation in retail businesses', in *2011 International Conference on Information Management, Innovation Management and Industrial Engineering (ICIII)*, IEEE, November, Vol. 3, pp.161–164.

Weimer-Jehle, W. (2006) 'Cross-impact balances: a system-theoretical approach to cross-impact analysis', *Technological Forecasting and Social Change*, Vol. 73, No. 4, pp.334–361.

Yang, Q., Pang, C., Liu, L., Yen, D.C. and Tarn, J.M. (2015) 'Exploring consumer perceived risk and trust for online payments: an empirical study in China's younger generation', *Computers in Human Behavior*, September, Vol. 50, pp.9–24.

Zali, N. (2009) *Forecasting Regional Development with Scenario Planning Approach*, PhD Dissertation, in Persian, Social Science Faculty, University of Tabriz.