

# Fuzzy Sketch for Implementation of E-Business Plan in Iran SMEs (Case Study: Yazd Industrial Town-Iran)

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## Abstract

Significant developments in IT and communications systems in the world specifically in recent decades have prompted under-developed countries to become sensitive to new opportunities and undertake an all-out planning to register a jump in their development and increase their economic and social growth in a bid to narrow their gap with developed countries and even vie with them. To that effect, e-commerce has been lent too much credence and our study here seeks to analyze the elements required for implementing e-business plans in small and medium-sized enterprises. To this end, we present a fuzzy map-based methodology in order to explore the most important critical success or failure factors for implementing e-business plan. Conducting an analysis on 61 indices bring us to the conclusion that factors like development, education and management of human resources, production scheduling, foreign relations management, communications systems and financial management are among the important critical failure factors.

**Keywords:** E-commerce, E-business plan, Critical success and failure factors, Fuzzy logic, SMEs

## 1. Introduction

Today, the Information Technology has caused numerous developments in commerce. These developments are not due to the facility or rapid growth of IT and the main reason behind the daily-increasing use of IT and Internet is the ability to cross international frontiers and exchange data regardless of geographical restrictions (Hayak, 2002).

E-business is one of the IT and communications sectors to have been widely experienced in the past decade. Most enterprises are implementing e-business plan in an attempt to win a toehold in global markets and win over new, influential and effective customers. But using e-business plan in commercial activities requires attention to a series of influential endogenous and exogenous factors. The enterprises' heed to these factors and planning to make the best use of e-business technology will guarantee their success and help them grow (Gharbali Moqaddam and Eqdami, 2003).

All pieces of research conducted hitherto about e-business have pointed only to specific aspects of the relevant factors. But in our research, we are determined to study the research activities carried out so far in order to identify all relevant factors in view of finding out the most important critical success and failure factors in implementation of e-business plan in small and medium-sized enterprises.

Since in our research, we cite views of experts and interviews in a qualitative manner, assessment of the views of the sample space by non-fuzzy methods could be called into question for two reasons. The first and foremost is that non-fuzzy methods ignore the ambiguity related to individual judgments when figures are transferred. The second point is that mental judgment, choice and priority of assessors largely impact the results (Ching et al, 2005). But fuzzy methods serve as helpful tool for handling vague problems. Fuzzy concepts can help us use linguistic variables in naturally colloquial language for assessment of indices and present more precise analyses by connecting these variables with proper membership functions. This article seeks to implement a fuzzy approach to examine the factors contributing to the implementation of e-business plan.

## 2. Literature review

Small businesses play an important role in economies all over the world by creating jobs and contributing to the socio-economic development of their communities. Small business owners possess little or no training on ITs and lack awareness of the benefits that ITs may provide to their business. The result is a major barrier to IT

adoption. The smaller the enterprise, the greater that this problem becomes, since most small companies are not using IT for their business activities (Wolcott, 2008).

Electronic business is defined as doing business through automatic transactions, exchanges and interactions by information and communications technologies in view of economic objectives. E-business may include inter-organizational systems like telephone, Internet, email or intranet to support online commerce. Therefore, one can say that e-business requires automatic transactions in business (Hanafizadeh, 2006)

Depending on whether organizations or individuals are the adversary party, e-business could be classified as follows. Relationships take shape based on commercial objectives.

- Business to Business (B2B)
- Business to Consumer (B2C)
- Consumer to Consumer (C2C)
- Business to Government (B2G)
- Government to Business (G2B)

E-business plan in different markets requires knowledge about the obstacles on the way of implementing this technology in the economy of each country (with regards to cultural, social, political and economic differences) specifically in their financial markets. Numerous studies have been conducted about these obstacles and we refer to them in short.

Akkerenand and Cavaye (2002) have divided the factors influencing electronic commerce into three groups:

- 1) The features of manager and owner (perceived interests, computer knowledge, self-confidence, perceived control, mental norms)
- 2) Investment efficiency rate
- 3) Features of the organization (readiness, external pressure, complexity of structure, information intensity)

Flynn and Purchase (2001) have their own classification of barriers:

- 1) Technical barriers: encoding, lack of qualified staff, low-speed Internet, compatibility to different systems
- 2) Financial barriers: Inability to reach the proper output, high-risk investment, costly training of staff, lack of productivity and mistrust of the market, available credit, high implementation costs
- 3) Organizational barriers: Lack of commerce models, weak programming and organization, lack of enough knowledge, lack of infrastructure, resistance of trade partners, implementation scheduling, lack of interest in EC
- 4) Behavioral barriers: Confidence and risk, cheating, resistance to any change in the current processes, need for new training courses

Mukti (2000) examined the barriers to implementation of EC and expressed them in terms of significance as follows: security, financial and contractual barriers, hackers intervention, lack of skilful IT staff, Internet phishing, lack of globalization activities, confidentiality, ownership, insufficient computers and Inquisition.

In developing countries, extensive Internet restrictions could be attributed to the market and infrastructural factors controlling access to ICTs (Mercer, 2006).

Moreover, producers of ICT products have found leading distributors often in developed countries thereby limiting the access to developing countries. Lack of access to credit cards is a main barrier to e-business development. Previous studies have reached that conclusion in B2C electronic commerce in Russia, India and Latin America. In Asia, between 35 and 40 percent of exchanges are carried out in cash (face-to-face) (Biederman, 2002). Other aspects of financial systems have also lagged behind standards and they have failed to progress as they merit. For instance in the Caribbean islands, banks offer no online exchanges or electronic payment.

Political barriers are created in an organized way by official groups. Many developing countries lack any regulations to recognize and certify digital and electronic signature. Some developing countries regard ICT products as luxury materials and they levy customs duties, value-added tax and extra commercial rights on them (UNCTAD, 2002). For their part, weak official organs contribute to lowering the customer's confidence in EC and their inclination for online purchase.

A relevant study conducted in Brazil attributes the low rate of incompatibility with EC to the lack of any EC regulations, insufficient support for Internet purchases, concerns about privacy and confidentiality and Internet taxation (Tigre and Dedrick, 2004).

In developing countries, the organization's staff, the nature of the activity, technological resources, lack of knowledge about potential opportunities, incompatibility with new phenomena and inclination for inertia result in a negative impression about EC (Molla and Licker, 2005).

The lack of knowledge among customers about the advantages of EC and their mistrust of the electronic service providers also hinder any development of EC in these countries. For instance, the low level of tendency to use credit cards in Latin America is attributed to their mistrust of service providers rather than to their limited access (Hilbert, 2001). Another study showed that confidence in post networks for a 100-dollar package is strongly compatible with GNP per capita (the purchasing power factor). Also, concerns related to post robberies hamper EC in Tanzania (Kshetr, 2007).

A total of 61 indices identified through the literature of the research works already done classified within ten criteria. The elements and factors used in this research are illustrated in Table 1 (Ozer, 2002; Kendall, 2001; Cooper, 1999; Grandon & Pearson, 2004; Ling, 2001; Rashid & Qirim, 2001; Wang & Tsai, 2002; Heck & Ribbers, 1999; Daniel & Gkimshaw, 2002; Molla & Licker, 2001; Quaddus & Didi, 2005).

### 3. Methodology

In this study, we intend to work out a methodology for elucidation of fuzzy sketch and identification of critical success and failure factors in implementation of e-business plan in SMEs by using fuzzy assessment principles.

#### 3.1. Sample

A total of 130 managers and experts from small and medium-sized enterprises active in the Yazd industrial town participated in the study.

#### 3.2. Designing the research questionnaire

A questionnaire based on the factors presented in table 1 has been designed and distributed among participants in question to measure the performance and significance of factors of e-business plan implementation in SMEs. Some variables like the sector in which the firms have been active and duration of the firm's life have been control variables and haven't had effect on the other variables.

The vagueness and uncertainty arising in human evaluation of these indices makes the conclusion inaccurate and imprecise, but the fuzzy logic takes into account the vagueness and uncertainty and offers a proper tool for dealing with them. The linguistic variables and fuzzy numbers used in this research have been proposed in Table 2.

#### 3.3. Validity & Reliability of research tool

In order to endorse the content and criterion validity, the university professors and experts were asked to express themselves about the items of each factor using the following terms: absolutely appropriate, appropriate, somewhat appropriate, inappropriate and absolutely inappropriate. Once the views collected, the validity of the questionnaire of our research was estimated at 0.894.

The Cronbach's alpha has been calculated in order to confirm the reliability of the questionnaire. It has been computed at 0.970. The alpha calculated for each factor is above 0.70, showing the acceptability of the reliability of the questionnaire.

#### 3.4. Integration of views

Many methods like average, median and mode could be used for integrating the evaluations of different decision-makers. Average has largely been used in different pieces of research and here we use it again.

Assume the assessment committee is comprised of  $m$  assessors,  $E_{jt}, t=1, 2, \dots, m$  and the elements of e-business are indicated with  $F_j, j=1, 2, \dots, n$ . Moreover, suppose that there are  $R_{jt} = (a_{jt}, b_{jt}, c_{jt})$  and  $W_{jt} = (x_{jt}, y_{jt}, z_{jt})$  fuzzy numbers used for estimating linguistic phrases to show the performance and importance of each element respectively.

The following formulas show how the fuzzy ranking mean  $R_j$  and the weighted fuzzy mean  $W_j$  are calculated.

$$\text{Formula 1: } R_j = (a_j, b_j, c_j) = (R_{j1}(+)R_{j2}(+) \dots (+)R_{jm}) / m.$$

$$\text{Formula 2: } W_j = (x_j, y_j, z_j) = (W_{j1}(+)W_{j2}(+) \dots (+)W_{jm}) / m.$$

The fuzzy numbers corresponding to the linguistic evaluations of the elements have been illustrated in Table 3 in the Appendix.

### 3.5. Locating items on the fuzzy sketch of e-business plan implementation SMEs

The vertical pivot describes the performance and the horizontal one describes the significance of the factors of implementing e-business plan in SMEs. The data are finalized and each pivot is divided into three segments to give nine geographical locations. Each item will be located in a unique position based on the score it has obtained in the preceding step.

Like a geographical map, this map will locate the items of implementation of e-business plan. The locations on the diameter of the matrix show the balance between the significance and performance. The factors lying there enjoy relative balance because the scores are mean. Three locations above the diameter show defection and fault due to the fact that their performance has not been heeded despite the high importance of elements. And the three locations beneath the diameter indicate the elements with overwork compared to their significance.

Based on the data provided in Table 3 of Appendix, the fuzzy sketch is like Figure 1.

### 3.6. Ranking critical success and failure factors in e-business plan implementation

The faulty factors are in fact barrier hindering the implementation of e-business plan in SMEs and they are considered to be critical failure factors. Similarly, the factors located beneath are critical success factors. Since it is impossible to concentrate on all of these factors, they need to be ranked and then the most important and most influential of them would be identified by Pareto Law.

#### 3.6.1. Weighted Performance of Factors of E-Business Plan Implementation in SMEs

Considering the significance of factors and their performance together can promote the ability to elucidate the success or failure indicator. Based on this interpretation, the factors with higher degree of significance and performance get higher scores. The significance is multiplied by the performance to produce a fuzzy number for ranking. And for critical failure factors ranking, the important point is that harmful factors are those with lower performance, regardless of their high significance. In order to obtain an indicator to measure the critical degree of these factors, the significance has first to be inversed before being multiplied by performance. The resultant in a progressive form will be indicative of the harmfulness of factors.

Suppose  $W_j, R_j, j = 1, 2, \dots, n$  are fuzzy performance and fuzzy significance given to the item (j) and we are in the critical success factors area. The fuzzy numbers indicative of the final significance of these factors in success are calculated as follows:

$$\text{Formula 3: } CSFS = \sum_{j=1}^n (W_j(0)R_j)$$

On the other hand, in case the aforementioned scores belong to critical failure factors, the fuzzy numbers are calculated as follows:

$$\text{Formula 4: } CFFS = \sum_{j=1}^n ((1 - W_j)(0)R_j)$$

The critical success and failure factors have been ranked in Tables 4 and 5 in the Appendix.

#### 3.6.2 Most influential critical success and failure factors in e-business plan implementation

In this stage, the scores from the previous stage are ranked in order to clarify their significance to senior managers and decision-makers. The 5<sup>th</sup> column of Table 4 and 5 of Appendix(Index column) show the priority for fuzzy numbers.

Since taking into consideration a large number of variables in a short period of time is impossible, it would be necessary to determine the most influential ones. Pareto Law can help us achieve this objective. According to this law, 80 percent of effects are due to 20 percent of causes. Based on this principle, paying attention to this 20 percent could influence 80 percent of effects. The 6<sup>th</sup> and 7<sup>th</sup> columns of Tables 4 and 5 in the Appendix show the relevant calculations.

According to Table 4 and 5, the most critical failure factors are as follows:

- Development, education and management of human resources
- Production scheduling
- Foreign relations management
- Upgraded communications systems
- Generation and management of finance

And the most important critical success factors are:

- Price of commodities or services
- Performance of customers
- International relations

#### 4. Conclusion

This research has been conducted to provide the grounds for implementing e-business plan in small and medium-sized enterprises. To that effect, the literature of the research and feedback of views of experts helped identify 61 elements within the framework of ten factors. The conclusion from fuzzy set was that the most important critical failure factors in the e-business plan included development, education and management of human resources, production scheduling, management of foreign relations, upgraded communications systems in the organization as well as generation and management of funds. The following points could be taken into account for improving the implementation job.

- (1) Long-term planning to remove barriers to e-business and e-commerce
- (2) Reconsidering the processes in small and medium-sized enterprises in order to serve customers based on competitive advantages due to IT and communications technology
- (3) Convincing managers about their tasks vis-à-vis e-business plan
- (4) Training the staff about new skills about e-business
- (5) Regular investment in IT and communications to boost the security of electronic networks
- (6) Employing prominent experts and qualified managers
- (7) Management stability, reduced purge among decision-makers and setting a scheduling for e-business implementation

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### Appendix

Table 1. Factors of implementing e-business plan

Factor	Items	Factor	Items
Supply Chain	Services to customers	Management	Development, education and management of human resources
	Processing orders		Management of information resources and systems
	Transportation system		Management of physical and financial resources
	Production scheduling		Implementation of programs
	Inventory planning		Management of improvement and change
	Sales and logistics		Management of foreign relations
	Relations with vendors		Acquisition, creation and management of finance
Customer	Good relations with customers	Technical Requirements	Management of strategic projects
	Providing services to customers		Operation of informatics section and connection to Internet network
	Monitoring market changes and customer satisfaction		Wireless communications
	Performance of customers		Upgraded communications systems
Competitors	Making the organization agile and flexible		Systems analyzer presence
	Benchmarking models of successful rivals		Internet address (official website)
	Innovation in marketing		Emergency power system for the network
	Winning foothold in markets where rivals are successful		High security of the network
	Conquering untapped markets where rivals are still absent		International relations
	Signing strategic contracts		Secure E-payment
Suppliers	Price of commodities or services	Financial Infrastructures	Development of credit cards
	Quality (the ranking earlier agreed upon)		Development of banking network
	On-time delivery	Organization Type	Organizational culture
	Financial capability of supplier to make repay debts		Size of the organization
	Geographical position of supplier		Contribution of senior managers
	Continued improvement of services or commodities	Productions & Services	Organizational structure
	Creativity		Designing products and services
Political & Law Infrastructures	Electronic contracts		Evaluating the effectiveness of new products/services
	Electronic signature		Preparation for production
	Guaranteed operation		Innovation development process and offering new products or services
	Intellectual property rights law	Output	
	Privacy	Innovation in the production process	
	Cybercrimes		
	Supporting consumers		
Customs duties			

Table 2. Linguistic variable &amp; Fuzzy numbers

Linguistic variable	Value
Very Low	(0, 0.5, 1.5)
Low	(1, 2, 3)
Fairley Low	(2, 3.5, 5)
Medium	(3, 5, 7)
Fairley High	(5, 6.5, 8)
High	(7, 8, 9)
Very High	(8.5, 9.5, 10)

Table 3. Fuzzy scores of importance and performance of items

	Item	Importance	Performance
X1	Development, education and management of human resources	(8.43,9.28,7.36)	(3.20,4.82,6.44)
X2	Management of information resources and systems	(6.98,8.07,9.04)	(3.25,4.79,6.34)
X3	Management of physical and financial resources	(6.60,7.76,8.82)	(3.80,5.42,7.03)
X4	Implementation of programs	(6.85,7.98,8.82)	(3.87,5.41,6.93)
X5	Management of improvement and change	(7.73,7.94,8.96)	(3.34,4.86,6.41)
X6	Management of foreign relations	(7.05,8.15,9.08)	(3.01,4.68,6.36)
X7	Acquisition, creation and management of finance	(4.06,8.15,9.08)	(3.37,4.89,6.45)
X8	Management of strategic projects	(6.48,7.69,8.79)	(3.82,5.37,6.91)
X9	Operation of informatics section and connection to Internet network	(6.55,7.75,8.82)	(3.15,4.79,6.45)
X10	Wireless communications	(6.45,6.73,8.73)	(3.27,4.82,6.38)
X11	Upgraded communications systems	(7.03,8.11,9.05)	(3.23,4.69,6.16)
X12	Systems analyzer presence	(6.35,7.60,8.73)	(2.84,4.24,5.67)
X13	Internet address (official website)	(7.43,8.49,9.32)	(4.39,5.89,7.39)
X14	Emergency power system for the network	(6.74,7.88,8.88)	(3.83,5.42,7)
X15	High security of the network	(6.76,7.94,8.96)	(3.30,4.93,6.57)
X16	International relations	(5.55,7.59,8.39)	(3.31,4.89,6.48)
X17	Secure E-payment	(6.47,7.66,8.75)	(3.30,4.77,6.23)
X18	Development of credit cards	(6.62,7.80,8.85)	(3.35,5.6.66)
X19	Development of banking network	(6.04,7.26,8.41)	(3.02,4.51,6.01)
X20	Organizational culture	(6.49,7.67,8.72)	(3.81,5.3.6.76)
X21	Size of the organization	(6.47,7.72,8.80)	(3.10,4.59,6.10)
X22	Contribution of senior managers	(6.47,7.70,8.79)	(3.63,5.21,6.78)
X23	Organizational structure	(6.13,7.37,8.54)	(3.50,5.16,6.81)
X24	Designing products and services	(6.55,7.75,8.82)	(3.404.89,6.38)
X25	Evaluating the effectiveness of new products/services	(6.32,7.56,8.71)	(3.34,4.95,6.57)
X26	Preparation for production	(6.77,7.92,8.95)	(4.25,5.76,7.25)
X27	Innovation development process and offering new products/services	(6.48,7.66,8.74)	(3.12,4.64,6.17)
X28	Output	(7.17,8.25,9.17)	(4.15,5.68,7.22)
X29	Innovation in the production process	(7.05,8.15,9.08)	(3.49,5.10,6.73)
X30	Services to customers	(6.49,7.67,8.75)	(3.54,5.07,6.59)
X31	Processing orders	(6.52,7.71,8.81)	(4.00,5.55,7.08)
X32	Transportation system	(6.02,7.33,8.55)	(4.01,5.54,7.05)
X33	Production scheduling	(6.82,7.97,8.98)	(2.83,4.23,5.69)
X34	Inventory planning	(6.47,7.70,8.79)	(3.54,4.94,6.34)
X35	Sales and logistics	(6.57,7.74,8.83)	(3.90,5.48,7.03)
X36	Relations with vendors	(6.32,7.54,8.68)	(3.95,5.56,7.15)
X37	Good relations with customers	(6.15,7.42,8.61)	(3.42,5.6.57)
X38	Providing services to customers	(6.67,7.82,8.86)	(4.10,5.70,7.29)
X39	Monitoring market changes and customer satisfaction	(6.77,7.92,8.95)	(3.49,5.09,6.68)
X40	Performance of customers	(5.49,6.87,8.18)	(3.5,5.09,6.69)
X41	Making the organization agile and flexible	(6.21,7.48,8.64)	(3.34,4.88,6.42)
X42	Benchmarking models of successful rivals	(7.10,8.24,9.16)	(3.46,4.96,6.43)
X43	Innovation in marketing	(7.03,8.11,9.05)	(3.27,4.87,6.48)
X44	Winning foothold in markets where rivals are successful	(7.23,8.31,9.21)	(3.46,5.08,6.71)
X45	Conquering untapped markets where rivals are still absent	(6.37,7.62,8.72)	(3.72,5.31,6.91)

X46	Signing strategic contracts	(7.09,8.19,9.11)	(3.90,5.47,7.04)
X47	Price of commodities or services	(5.59,6.98,8.30)	(3.45,4.93,6.42)
X48	Quality (the ranking earlier agreed upon)	(6.55,7.71,8.79)	(3.35,4.87,6.39)
X49	On-time delivery	(6.99,8.10,9.05)	(4.05,5.64,7.24)
X50	Financial capability of supplier to make repay debts	(6.21,7.48,8.64)	(3.87,5.40,6.92)
X51	Geographical position of supplier	(6.65,7.82,8.85)	(4.64,6.09,7.52)
X52	Continued improvement of services or commodities	(6.51,7.68,8.75)	(4.25,5.80,7.33)
X53	Creativity	(6.82,7.96,8.95)	(3.54,5.08,6.62)
X54	Electronic contracts	(7.15,8.26,9.16)	(3.41,4.98,6.53)
X55	Electronic signature	(6.95,8.07,9.03)	(3.29,4.79,6.31)
X56	Guaranteed operation	(6.81,7.93,8.95)	(3.31,4.95,6.59)
X57	Intellectual property rights law	(6.97,8.12,9.08)	(3.42,4.97,6.51)
X58	Privacy	(6.37,7.62,8.72)	(3.53,5.15,6.78)
X59	Cybercrimes	(6.97,8.09,9.05)	(3.04,4.68,6.33)
X60	Supporting consumers	(6.65,7.84,8.89)	(4.05,5.65,7.23)
X61	Customs duties	(7.06,8.17,9.10)	(3.93,5.51,7.09)

Table4. Prioritizing critical failure factors

Items	Importance	Performance	$((1 - W_j)(0)R_j)$	Index	Relative Importance	Accumulative Frequency
X1	(8.43,9.28,7.36)	(3.20,4.82,6.44)	(2.27,7.55,16.9)	0.556	0.045	0.045
X33	(6.82,7.97,8.98)	(2.83,4.23,5.69)	(2.87,8.56,18.0)	0.551	0.044	0.089
X6	(7.05,8.15,9.08)	(3.01,4.68,6.36)	(2.74,8.63,18.7)	0.550	0.044	0.133
X11	(7.03,8.11,9.05)	(3.23,4.69,6.16)	(3.05,8.83,18.2)	0.550	0.044	0.177
X7	(4.06,8.15,9.08)	(3.37,4.89,6.45)	(3.07,9.03,18.9)	0.548	0.044	0.221
X2	(6.98,8.07,9.04)	(3.25,4.79,6.34)	(3.10,9.24,19.1)	0.548	0.044	0.264
X29	(7.05,8.15,9.08)	(3.49,5.10,6.73)	(3.18,9.40,19.8)	0.546	0.044	0.308
X12	(6.35,7.60,8.73)	(2.84,4.24,5.67)	(3.48,10.0,20.7)	0.543	0.044	0.352
X21	(6.47,7.72,8.80)	(3.10,4.59,6.10)	(3.59,10.1,20.6)	0.542	0.043	0.395
X27	(6.48,7.66,8.74)	(3.12,4.64,6.17)	(3.43,10.1,21.2)	0.541	0.043	0.438
X4	(6.85,7.98,8.82)	(3.87,5.41,6.93)	(3.71,10.4,21.5)	0.541	0.043	0.482
X9	(6.55,7.75,8.82)	(3.15,4.79,6.45)	(3.93,10.8,21.7)	0.541	0.043	0.525
X17	(6.47,7.66,8.75)	(3.30,4.77,6.23)	(3.97,10.8,21.8)	0.540	0.043	0.568
X10	(6.45,6.73,8.73)	(3.27,4.82,6.38)	(3.72,10.7,22.2)	0.539	0.043	0.612
X14	(6.74,7.88,8.88)	(3.83,5.42,7)	(4.01,10.9,21.9)	0.539	0.043	0.655
X42	(7.10,8.24,9.16)	(3.46,4.96,6.43)	(4.10,11.1,22.0)	0.539	0.043	0.698
X43	(7.03,8.11,9.05)	(3.27,4.87,6.48)	(3.84,10.9,22.4)	0.539	0.043	0.741
X44	(7.23,8.31,9.21)	(3.46,5.08,6.71)	(4.26,11.3,22.3)	0.539	0.043	0.784
X53	(6.82,7.96,8.95)	(3.54,5.08,6.62)	(4.13,11.4,22.6)	0.539	0.043	0.827
X54	(7.15,8.26,9.16)	(3.41,4.98,6.53)	(4.25,11.4,22.7)	0.539	0.043	0.871
X55	(6.95,8.07,9.03)	(3.29,4.79,6.31)	(3.66,10.5,21.5)	0.539	0.043	0.914
X57	(6.97,8.12,9.08)	(3.42,4.97,6.51)	(4.51,12.2,24.3)	0.539	0.043	0.957
X59	(6.97,8.09,9.05)	(3.04,4.68,6.33)	(2.89,8.71,18.6)	0.539	0.043	1.000

Table 5. Prioritizing critical success factors

Items	Importance	Performance	$W_j(0)R_j$	Index	Relative Importance	Accumulative Frequency
X47	(5.59,6.98,8.30)	(3.45,4.93,6.42)	(5.48,14.8,28.3)	0.5140	0.0772	0.0772
X40	(5.49,6.87,8.18)	(3.5,5.09,6.69)	(6.3,15.9,30.1)	0.5137	0.0772	0.1544
X16	(5.55,7.59,8.39)	(3.31,4.89,6.48)	(5.32,11.7,28.7)	0.5136	0.0772	0.2316
X23	(6.13,7.37,8.54)	(3.50,5.16,6.81)	(5.08,13.5,26.3)	0.5127	0.0770	0.3087
X32	(6.02,7.33,8.55)	(4.01,5.54,7.05)	(5.80,14.7,28.0)	0.5120	0.0769	0.3856
X36	(6.32,7.54,8.68)	(3.95,5.56,7.15)	(5.19,13.6,26.3)	0.5116	0.0769	0.4625
X35	(6.57,7.74,8.83)	(3.90,5.48,7.03)	(4.56,12.3,24.0)	0.5115	0.0769	0.5393
X31	(6.52,7.71,8.81)	(4.00,5.55,7.08)	(4.75,12.6,24.6)	0.5114	0.0768	0.6162
X60	(6.65,7.84,8.89)	(4.05,5.65,7.23)	(4.47,12.1,24.2)	0.5111	0.0768	0.6930
X52	(6.51,7.68,8.75)	(4.25,5.80,7.33)	(5.28,13.4,25.5)	0.5110	0.0768	0.7698
X38	(6.67,7.82,8.86)	(4.10,5.70,7.29)	(4.66,12.4,24.2)	0.5110	0.0768	0.8466
X26	(6.77,7.92,8.95)	(4.25,5.76,7.25)	(4.46,11.9,23.4)	0.5108	0.0768	0.9233
X51	(6.65,7.82,8.85)	(4.64,6.09,7.52)	(5.30,13.2,25.1)	0.5103	0.0767	1.0000

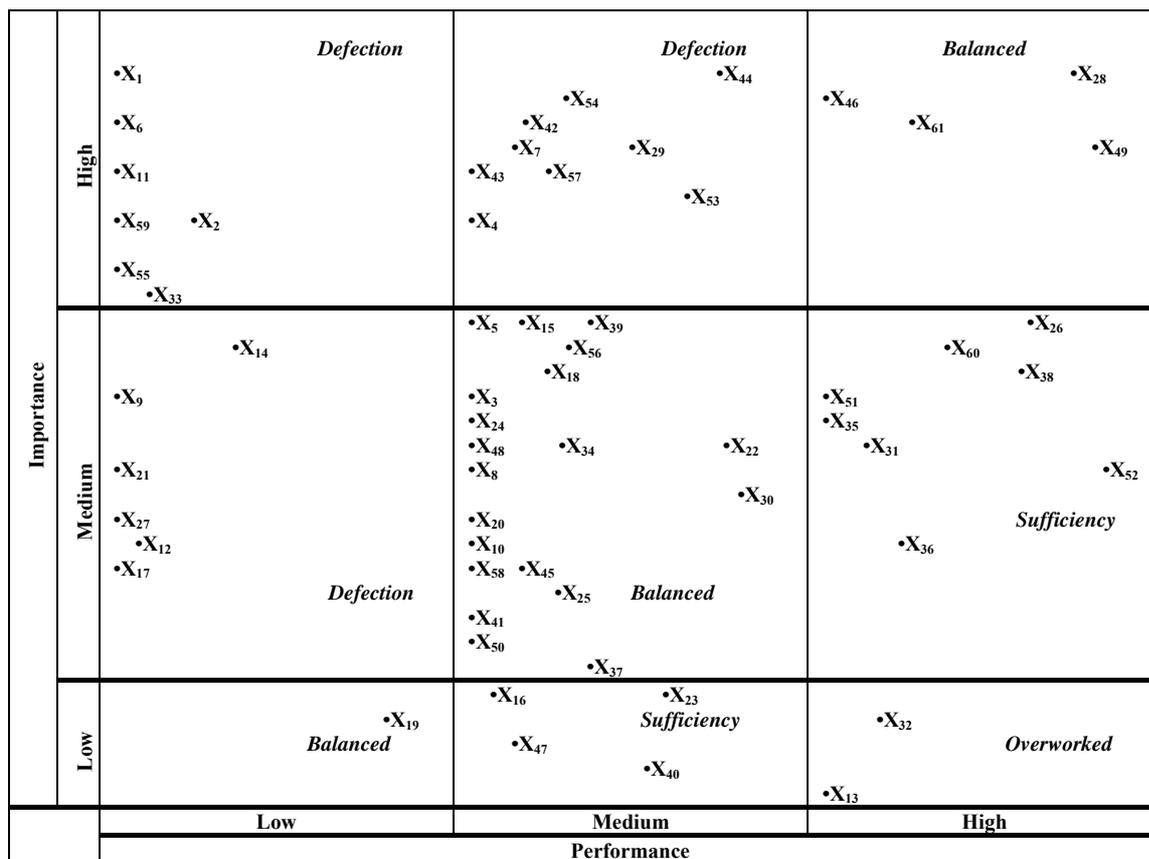


Figure 1. The Fuzzy sketch of e-business plan implementation