

Identifying and Ranking the Driving Affecting Factors on Success in E-Commerce

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Abstract

Nowadays marketing is one of the most important activities of the organizations and when marketing department works productively, the organization will be more profitable. The purpose of writing the current paper is to prioritize the driving affecting factors on success in E-Commerce in Central Bureau of Mellat Bank (a great one in Iran). The research is applicable from goal view and descriptive from data collection. Also data collection method is library and fieldwork. For measuring the driving affecting factors on success in e-commerce, four main dimensions include efficiency, innovation, ability to valorize by colleagues and consolidating relation with customers were utilized. The results of applying fuzzy TOPSIS technique showed that “loyalty plans”, “marketing, sale and advertising” and “horizontal goods” are the most important sub criteria and “Dependence of business model structure to copy right laws and business secrets” is the last one.

Keywords: information technology, e-commerce, multi criteria decision making, fuzzy TOPSIS technique

Introduction

During the last few years, the electronic business has become one of the main phenomena and topics discussed among the researchers and business practitioners. This discussion does not only apply in the case of the Internet hype, but also in terms of business opportunity, and the era of potential profitability. In this paper, we focus on electronic business models through five case companies representing the following industries: travelling, media, telecom, logistics, and paper. We have based the study on an electronic business model framework that aims at evaluating electronic business models according to the electronic business model life cycle. In evaluation, we have used critical success factors (CSF) and customer need factors (CNF) in order to analyze the maturity of success in these electronic business models. CSFs are those factors, which will ensure competitive success of a firm (Aaker, 1989, 1992; Day, 1984, 1986; Rockart, 1979). CNFs are derived from the customers' based on comprehensive market

research. What individual customers really need may deviate from what a company needs to manage in order to ensure competitive success. It is, however, logical that the CSFs and CNFs fit. A mismatch is not uncommon and has extensively been studied in service quality – the Gap-model (Zeithaml and Bitner, 1996). The CSFs and CNFs are here seen as having a fundamental value-creating function for the firm and the customer. Therefore, they are important elements in a business model and they can be measured.

Several researchers (Afuah and Tucci, 2001; Amit and Zott, 2000; Applegate, 2001; Betz, 2002; Doig, 2000; Hedman and Kalling, 2003; Mahadevan, 2000; Peterovic et al., 2001; Rappa, 2000; Timmers, 1998; Trombly, 2000) from different disciplines have defined and discussed the business models. In order to define the term business model, we have chosen the following definition (Amit and Zott, 2001): “A business model depicts the design of transaction content (exchanged goods and information), structure (the

links between transaction stakeholders), and governance (the control and management of the flows of goods, information and resources) so as to create value through the exploitation of business opportunities.” One characteristic is common to all of these definitions: they emphasize the value creation through activities or structures described by a business model. Amit and Zott (2001) see that total value is created in transactions regardless of the role of value-creating participant. On the basis of the studies referred herein, we could say that the value creation structures and processes commonly describe the various business actors and their roles. Furthermore, they concentrate on transaction flows between actors, whereas value-capturing processes describe mainly the sources of revenues, and the ways revenue is gathered from these sources. In addition, the researchers have a specific approach to present their contribution to the business model discussion. Firstly, some of the authors use taxonomy (Applegate, 2001; Mahadevan, 2000; Rappa, 2000; Timmers, 1998), component listing (Afuah and Tucci, 2001; Amit and Zott, 2001; Hedman and Kalling, 2003; Linder and Cantrell, 2000) or ontology (Osterwalder and Pigneur, 2002) in explaining the structure of business model concept. Secondly, authors describe business models with change model methodologies (Linder and Cantrell, 2000), quantitative and qualitative measures (Afuah and Tucci, 2001) or life cycle models (Applegate, 2001) in order to gain an understanding over the dynamic nature of a specific business model. Interestingly, Applegate (2001) discusses electronic business model evolution through four steps, but without any specific empirical evidence motivating the steps.

Literature review

The term “commerce”, in this paper, refers to selling and purchasing of goods and services in both business- and consumer segments and to activities directly related with such transactions.

Examples of such activities are marketing measures and after-sales services. The related activities are included so as to take into account that not each and every transfer of ownership or rights to use a good or service may necessarily trigger a monetary transaction (Tiwari et al, 2006).

The term “business”, in this paper, refers to all activities undertaken by a firm in order to produce and sell goods and services. These activities are, thus, not exclusively of “commercial” nature and include other processes such as procurement, production, customer relationship management (CRM) and human resources management (HRM) (Tiwari et al, 2006).

The term “commerce” is hence seen as an integral subset of the broader term “business”. In accordance with this approach M-Commerce is regarded as an integral subset of M-Business (Buse, 2002; UNCTAD, 2004). E-Commerce is correspondingly seen as an integral subset of E-Business.

A simple definition of E-Commerce describes it as: “(...) the buying and selling of products and services over the Web” (Kalakota and Robinson, 2002). However, there are several definitions of Ecommerce in circulation emphasizing its different aspects. Prevailing definitions may be divided into two primary categories. The first category works with a narrow, restrictive definition, requiring the whole transaction to take place in electronic form and having a monetary character. For example, the German Federal Statistical Office is reported to use the following definition: “Transactions are regarded as E-Commerce, when the offer as well as purchase or the actual availment of a product or service is carried out in electronic form using a computer-mediated network against monetary payment” (Fischer, 2003).

This definition, however, seems to be too restrictive as it does not recognize the fact that just some parts of a transaction might also be

carried out electronically without having to process all the steps of a value-chain in that form. Further, the emphasis on the monetary character ignores the commercial nature of marketing measures (e.g. transactions carried out with the intention of selling a product or service) and after-sales services (e.g. transactions carried out in continuation of a preceding monetary transaction).

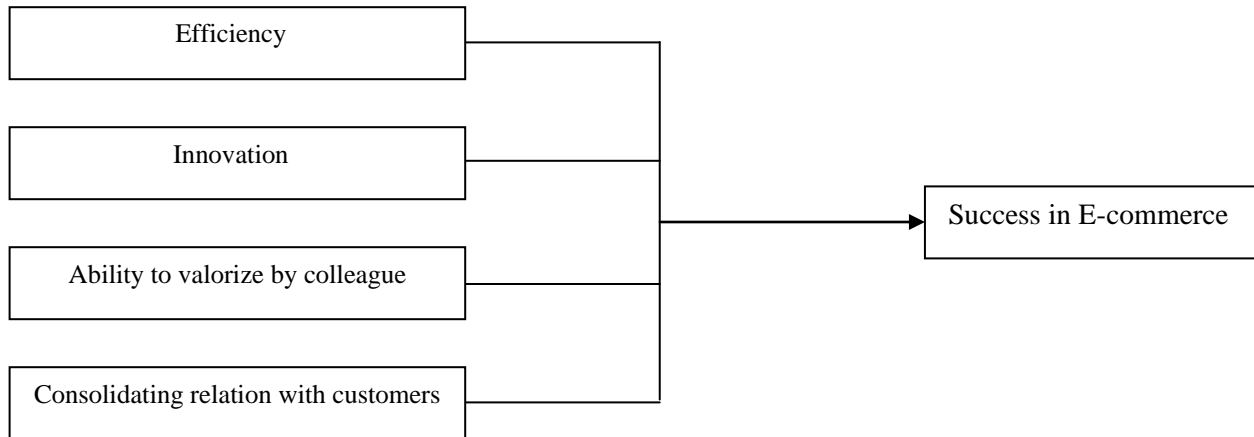
The second category works with a broader definition of E-Commerce, as can be seen in the definition used by the US Bureau of the Census, which defines E-Commerce as, “(...) any transaction completed over a computer-mediated network that involves the transfer of ownership or rights to use goods or services. (...) Completed

transactions may have a zero price (e.g., a free software download)” (Mesenbourg, 2001). Also according to the Organization for Economic Co-operation and development (OECD), it is the method used to place or receive an order, not the mode of payment or the channel of the delivery that determines whether a transaction is considered as an E-Commerce transaction (OECD, 2002). The primary criteria for E-Commerce, thus, are:

- a) The at least partially electronic form of a transaction, and
- b) The transfer of ownership or rights to use a good or service whether against monetary payment or otherwise.

Conceptual framework

The model below illustrated the driving affecting factors on E-business. In the model, efficiency, innovation, ability to valorize by colleagues and consolidating relation with customers are independent variables and success in E-business is dependent one.



Conceptual framework (Sambamurthy et al, 2003)

The study was done in a society involving 35 experts, IT and top managers of Mellat Bank (an Iranian one) which is adequate to survey. Therefore no sampling strategy was done.

For gathering data, library method and questionnaire were used. A questionnaire (with 40 questions) was applied for data gathering with 7point Chen scale.

To rank the indices of individual factors fuzzy TOPSIS technique were applied.

For assessing questionnaires validity experts' opinions were asked and to confirm its reliability Cronbach's alpha method has been used. The reliability results calculated 0.882, 0.793, 0.756, 0.848 and 0.739 for the questionnaire as a whole and each criterion accordingly.

3.1. Decision making process by fuzzy TOPSIS technique

Decision making process steps by fuzzy TOPSIS technique are shown below (Kalantari et al, 2012; 2013; Saeedi et al, 2012; Askari Masouleh et al, 2013):

Step 1: calculating weights vector w_j

Step 2: normalizing the calculated matrix

$$\tilde{R} = \left[\tilde{r}_{ij} \right]_{m \times n} \quad (1)$$

$B \subseteq \{1, \dots, n\}$ is related to benefit-based indices and $C \subseteq \{1, \dots, n\}$ is related to cost-based indices.

$$\tilde{r}_{ij} = \left(\frac{a_{ij}}{d_j^*}, \frac{b_{ij}}{d_j^*}, \frac{c_{ij}}{d_j^*}, \frac{d_{ij}}{d_j^*} \right), \quad j \in B \quad (2)$$

$$\tilde{r}_{ij} = \left(\frac{a_j^-}{d_{ij}}, \frac{a_j^-}{c_{ij}}, \frac{a_j^-}{b_{ij}}, \frac{a_j^-}{a_{ij}} \right), \quad j \in C \quad (3)$$

Step 3: so normalized weighted matrix is calculated as formula 4:

$$\tilde{V} = \left[\tilde{v}_{ij} \right]_{m \times n}, \quad i = 1, 2, \dots, m, \quad j = 1, 2, \dots, n \quad (4)$$

$$\tilde{v}_{ij} = \tilde{r}_{ij} \otimes \tilde{w}_j$$

Step 4: determining the fuzzy positive ideal solution \tilde{v}_j^* (FPIS) and fuzzy negative ideal solution \tilde{v}_j^- (FNIS) (formulas 5, 6):

$$\tilde{v}_j^- = \begin{cases} \min_{i=1, \dots, m} \tilde{v}_{ij}; & j \in B \\ \max_{i=1, \dots, m} \tilde{v}_{ij}; & j \in C \end{cases} \quad \tilde{v}_j^* = \begin{cases} \max_{i=1, \dots, m} \tilde{v}_{ij}; & j \in B \\ \min_{i=1, \dots, m} \tilde{v}_{ij}; & j \in C \end{cases}$$

$$FNIS = \{\tilde{v}_j^- \mid j = 1, \dots, n\} \quad (5)$$

$$FPIS = \{\tilde{v}_j^* \mid j = 1, \dots, n\} \quad (6)$$

Step 5: calculating the alternatives from positive and negative ideal by applying formulas 8,9:

$$d_i^* = \sum_{j=1}^n d(\tilde{v}_{ij}, \tilde{v}_j^*), \quad i = 1, \dots, m \quad (7)$$

$$d_i^- = \sum_{j=1}^n d(\tilde{v}_{ij}, \tilde{v}_j^-), \quad i = 1, \dots, m \quad (8)$$

Step 6: Calculating the relative closeness to the ideal solution:

$$Cc_i = \frac{d_i^-}{d_i^- + d_i^+} \tag{9}$$

In real-world situation, because of incomplete or non-obtainable information, the data (attributes) are often not so deterministic, there for they usually are fuzzy /imprecise. So, we try to extend TOPSIS for fuzzy data to prioritize e-learning dimensions. Linguistic variables for the important weight of each criterion are shown in table 1:

Table 1: Linguistic variables for the importance weight (Chen, 2000)

Very Low	VL	(0, 0, 1, 2)
Low	L	(1, 2, 2, 3)
Medium Low	ML	(2, 3, 4, 5)
Medium	M	(4, 5, 5, 6)
Medium High	MH	(5, 6, 7, 8)
High	H	(7, 8, 8, 9)
Very High	VH	(8, 9, 10, 10)

Data analysis

Decision making matrix with fuzzy weights is shown in table 2:

Table 1: Decision making matrix with fuzzy weights

	Efficiency				Innovation				ability to valorize by colleagues				consolidating relation with			
P1	5	6	7	8	5	6	7	8	8	9	10	10	4	5	5	6
P2	8	9	10	10	8	9	10	10	4	5	5	6	4	5	5	6
P3	5	6	7	8	4	5	5	6	2	3	4	5	5	6	7	8
P4	2	3	4	5	5	6	7	8	8	9	10	10	5	6	7	8
P5	8	9	10	10	8	9	10	10	7	8	8	9	2	3	4	5
P6	1	2	2	3	4	5	5	6	7	8	8	9	4	5	5	6
P7	8	9	10	10	7	8	8	9	4	5	5	6	4	5	5	6
P8	7	8	8	9	5	6	7	8	8	9	10	10	5	6	7	8
P9	2	3	4	5	2	3	4	5	2	3	4	5	5	6	7	8
P10	7	8	8	9	4	5	5	6	4	5	5	6	8	9	10	10
P11	7	8	8	9	5	6	7	8	5	6	7	8	4	5	5	6
P12	4	5	5	6	8	9	10	10	8	9	10	10	5	6	7	8
P13	7	8	8	9	4	5	5	6	4	5	5	6	8	9	10	10

P14	5	6	7	8	5	6	7	8	5	6	7	8	5	6	7	8
P15	2	3	4	5	5	6	7	8	8	9	10	10	2	3	4	5
P16	2	3	4	5	2	3	4	5	1	2	2	3	1	2	2	3
P17	5	6	7	8	8	9	10	10	8	9	10	10	4	5	5	6
P18	1	2	2	3	7	8	8	9	4	5	5	6	2	3	4	5
P19	7	8	8	9	4	5	5	6	7	8	8	9	7	8	8	9
P20	7	8	8	9	2	3	4	5	4	5	5	6	2	3	4	5
P21	8	9	10	10	8	9	10	10	7	8	8	9	5	6	7	8
P22	4	5	5	6	2	3	4	5	5	6	7	8	7	8	8	9
P23	2	3	4	5	8	9	10	10	2	3	4	5	4	5	5	6
P24	8	9	10	10	8	9	10	10	2	3	4	5	7	8	8	9
P25	7	8	8	9	7	8	8	9	5	6	7	8	7	8	8	9
P26	8	9	10	10	8	9	10	10	1	2	2	3	1	2	2	3
P27	5	6	7	8	2	3	4	5	5	6	7	8	7	8	8	9
P28	4	5	5	6	7	8	8	9	7	8	8	9	8	9	10	10
P29	4	5	5	6	4	5	5	6	4	5	5	6	2	3	4	5
P30	1	2	2	3	4	5	5	6	5	6	7	8	4	5	5	6
P31	7	8	8	9	2	3	4	5	7	8	8	9	2	3	4	5
P32	8	9	10	10	2	3	4	5	2	3	4	5	8	9	10	10
P33	2	3	4	5	4	5	5	6	7	8	8	9	7	8	8	9
P34	5	6	7	8	2	3	4	5	4	5	5	6	4	5	5	6
P35	5	6	7	8	8	9	10	10	8	9	10	10	8	9	10	10
P36	5	6	7	8	1	2	2	3	1	2	2	3	5	6	7	8
P37	4	5	5	6	8	9	10	10	4	5	5	6	8	9	10	10
P38	4	5	5	6	4	5	5	6	8	5	5	6	7	8	8	9
P39	2	3	4	5	8	9	10	10	7	8	8	9	7	8	8	9
P40	5	6	7	8	4	5	5	6	7	8	8	9	4	5	5	6

Finally applying formulas 8, 9 and 10 positive and negative ideal solutions, closeness index and final ranks of variables were computed as:

Table5: positive and negative ideal solutions, closeness index and final ranks of variables

Indices	D_i^+	D_i^-	Cc_i	Final rank
Exchange rate	1.45191847	1.651325983	0.532128876	4
Bargaining costs	1.854527098	1.2218289	0.397167591	22
Marketing, sale and advertising	1.235621428	1.895441133	0.605366739	2
Access to high volume of goods, services and information	1.682246038	1.416131612	0.457055844	12
Stock costs	1.916228043	2.046102721	0.516388672	6
Facility of exchange	2.732880201	1.073166069	0.281963485	36
Customers' demands' density	2.066648194	1.775298613	0.46208308	11
Supply density	2.01070853	1.761926821	0.467028127	9
Flexibility in exchange	2.899999268	0.864928433	0.229733079	39
Decreasing lack of information proportion about goods and colleagues	2.202051189	1.39778803	0.388291794	23
Exchange clarity	2.21734059	1.631129829	0.423838474	18
New colleague companies	2.024885933	1.769040242	0.4662822	10
New link between colleague companies	2.113150591	1.498236135	0.414864496	20
Links richness from quality and depth view	2.262339379	1.52052899	0.401951335	21
Royalties about business methods	2.509137808	1.416131612	0.360773099	27
Dependence of business model structure to copy right laws and business secrets	3.198347741	0.781806619	0.196426206	40
Introducing business model before others	1.987474834	1.897974609	0.488482642	7
Representing new goods, services or information	2.696985454	1.199566959	0.307853413	33
Creating new motivators	2.117710332	1.548449617	0.42236281	19
Mutual sale with business colleagues	2.627680236	1.276081934	0.326885163	32
Supply chain integration	2.451660766	1.192330604	0.327204563	31
Combination of offline and online exchange	1.956951563	1.119332156	0.363858557	26
Combination of offline and online resources and capabilities	1.746421969	1.383839527	0.442084321	13
Access to supplement goods, services and information of core output	2.284332335	1.746961028	0.433350012	15
Vertical goods or services	1.932465871	1.757635936	0.47631096	8
Horizontal goods	1.308673003	1.830082842	0.583059955	3
supplement information technologies for business colleagues	2.447059216	1.248266523	0.337796073	29

Motivators for creating special resources	2.026981143	1.58597689	0.438969087	14
Colleagues' capabilities for creating link with the company	2.719300405	1.158252824	0.298707137	35
Exchange reliability	2.805874542	1.005289909	0.263775002	37
Planning for creating link with companies	2.481395081	1.426743521	0.365069837	25
Exchange security mechanism	2.324035909	1.311171748	0.360686891	28
Invest on learning	2.466558699	1.202654408	0.327769026	30
Increasing trust by third one	2.670142137	1.165481095	0.303857033	34
Colleagues who have special assets	1.775738429	1.897974609	0.516636599	5
Special standards for top designing	2.878595812	0.865881446	0.231242277	38
Ordering goods and characteristics	2.093072404	1.555457822	0.426324499	17
Loyalty plans	1.089336272	2.046102721	0.652572965	1
Security of information flow and controlling processes	2.128126003	1.599859406	0.429148516	16
Monitoring customers by information	2.386023238	1.437848779	0.376019065	24

As table 3 shows “loyalty plans”, “marketing, sale and advertising” and “horizontal goods” were selected as the most important variables.

Conclusion and suggestions

The main purpose of writing the current paper is to rank the driving affecting factors on success in e-commerce by fuzzy TOPSIS technique. For this mean a model include efficiency, innovation, ability to valorize by colleagues and consolidating relation with customers was considered. The results of applying fuzzy TOPSIS technique illustrates that “loyalty plans” was chosen as the most important sub criterion and “Dependence of business model structure to copy right laws and business secrets” was the last one.

Considering the results, managers are advised to:

- Applying quality management systems like EFQM, 6 sigma, ISO and . . . to improve goods' quality
- Identifying customers' needs and desires by periodic meeting with them
- Considering special discount for loyal customers

- Increasing advertising quality
- Bargaining for allocating part of organizational profit for representing special services to special customers
- Utilizing modern marketing techniques like international business, internet marketing and e-commerce specially for Persian gulf countries

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