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The Evaluation of Smartphone Brand Choice: an Application with The Fuzzy Electre I Method

Sedat Belbag[1], Aybegum Gungordu[2], Tuba Yumusak[3], Kadri Gokhan Yilmaz[4]
[1,2,3,4]*(Business Administration, Faculty of Economics and Administrative Sciences, Gazi University, Turkey)*

ABSTRACT: *The purpose of our study is to measure consumers' evaluation of purchasing smartphones while considering the most effective criteria on buying smartphones. We consider top five smartphone brands that mostly comes into mind. First, we carried out a preliminary examination to determine the top five brands favoured by consumers. Furthermore, we asked about consumers' smartphone choosing criterias. Findings of the preliminary examination showed that the most preferred brands are Samsung, Apple, LG, HTC and Sony, respectively. The effective criteria in consumer preferences are noted as price, screen size, heaviness, ease of use, resolution, design and durability. Our main sample consisted of 250 students at Gazi University, Ankara. We used fuzzy ELECTRE I method to analyse the data. Considering seven criteria, we found that consumers firstly prefer Samsung, secondly iPhone and thirdly LG*

KEYWORDS -*choice criteria, consumer decision making process, Fuzzy ELECTRE I, multi-criteria decision making methods, smartphone brand*

I. INTRODUCTION

The market share of smartphones is daily growing in parallel with the recent technological developments. Except from used as a camera, a notepad or a communication device, smartphones can function as status symbols according to Ozcan and Kocak (2003) in developing countries such as Turkey. Therefore, smartphone purchasing decision seems to matter in multiple ways. Turkey adopted mobile phone technology in 1994 (Ozcan and Kocak, 2003). As a consequence of the rise in Turkey's tech-savvy youth population, who are very close followers of cutting edge technology and changing trends within social media platforms, along with rapidly ongoing urbanisation, new product launches in smart phones' sales increased (Euromonitor International, 2015). These "digital natives", who born after 1980 and grown up with the internet and have a strong domestic demand for new products and services, mobile operators are in a good position to capitalise on growth in the Turkish market (The Report: Turkey 2015, 2015). Turkish consumers' considerable interest in particularly smartphones, has increased the product's market volume by 23.1% in the first quarter of 2013, making Turkey the most rapidly growing country for mobile technology among 20 European countries (Information and Communications Technology, 2014). The smartphone market penetration rate is 19% as of February 2013 (Information and Communications Technology, 2014). The market size of top five smartphone brands on a worldwide scale can be seen in Table 1.

Table 1 Smartphone market (source: IDC, August 2015)

Period	Samsung	Apple	Huawei	Xiaomi	Lenovo	Others
2015Q2	21.4%	13.9%	8.7%	5.6%	4.7%	45.7%
2014Q2	24.8%	11.6%	6.7%	4.6%	8.0%	44.3%
2013Q2	31.9%	12.9%	4.3%	1.7%	5.7%	43.6%
2012Q2	32.2%	16.6%	4.1%	1.0%	5.9%	40.2%

Decision making has been a mathematical science today and aims to determine the best alternative among the others we need priorities for the alternatives to allocate their appropriate share of the resources (Saaty, 2008). Decision making process of consumers can be seen as a multi-critera decision making problem (MCDM). Although influenced by cultural, social, personal, psychological and environmental factors (Kotler, 1996), consumers decide with different criteria for each consumer goods. As can be seen in Fig. 1, consumer decision making is an entirely complex process. Scholars and practitioners should consider multilateral thinking to figure out the consumer blackbox. A typical choice consists of a set of alternatives, each described by several attributes (Bettman, Johnson and Payne, 1991). When selecting a product, the product attributes are in general conflicting, non-commensurable and fuzzy in nature and it is very difficult to satisfy all of them, simultaneously

(Agarwal and Jain, 2013). As a consequence of the complex nature of the consumer decision making, MCDM methods can be used to reduce the consumer confusion for potential consumers (Atmojo et al., 2014). Hereby, the term consumer confusion states that the feeling of regrets or disappointments as a result of non-satisfaction from the brand. Confusion reduction strategy helps the consumer to consider theworthiest product (Atmojo et al., 2014). The choice difficulty of consumers will increase with the number of alternatives and attributes, if some specific attributes are difficult to evaluate, if there is a great deal of uncertainty about the values of attributes and if the number of shared attributes becomes smaller (Bettman, Johnson and Payne, 1991). Evaluation stage of the consumer decision making process requires the consideration of consumers' relative importance of each attribute of the product-service mix (Reid and Bojanic, 2009). Therefore, multiple attribute decision making is best suited for the selection or evaluation based problems (Agarwal and Jain, 2013).

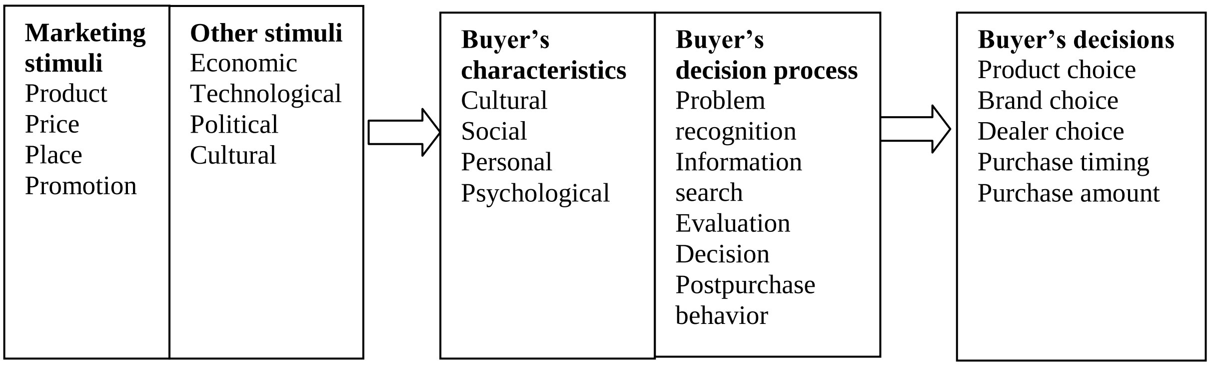

Figure 1 Consumer decision making process (source: Kotler, 2003)

Relatively few studies which are related to marketing area used MCDM methods. Tang and Tzeng (1998) used a hierarchy fuzzy MCDM method to study electronic marketing strategies in the information service industry. Gungor and Buyuker Isler (2005) applied the AHP to a automobile choice problem. Isiklar and Buyukozkan (2007) used the AHP and TOPSIS to evaluate mobile phone alternatives. Eleren (2007) used the AHP method to measure brand choice criteria of white goods. Dundar and Ecer (2008) applied the AHP to determine GSM operator choice of students. Saaty (2008) stated that Ford Motor Company used the AHP to establish priorities for criteria that improve customer satisfaction in 1999. Mohaghar et al. (2012) used the fuzzy AHP and the VIKOR to select a favorable marketing strategy. Wang and Tzeng (2012) suggested a MCDM model combining DEMATEL with ANP and VIKOR methods to clarify the interrelated relationships of brand marketing and to evaluate the customer's satisfaction of brand marketing with three electronic manufacturing companies. Agarwal and Jain (2013) used a fuzzy approach to define the product that is the closest to the customer preference for a laptop computers vendor. Atmojo et al. (2014) developed a single-user decision support system model, based on Fuzzy Simple Additive Weighting Algorithm, to reduce consumer confusion in smartphone purchases. Jafarnejad and Lotfi (2014) evaluated customers' satisfaction in the industrial company with uncertainty by using Fuzzy Delphi method. Noori (2015) used fuzzy AHP for marketing mix planning. Our brief review shows that none of the above mentioned studies has addressed a MCDM method with considering fuzzy environment in consumer decision making process throughly. This study adopts Fuzzy ELECTRE I method to measure consumers' evaluation of smartphone brand choice while considering the most effective criteria on buying smartphones.

The rest of the paper is structured as follows. Section 2 presents background information about MCDM and introduces the proposed Fuzzy ELECTRE I method. Section 3 presents the results of Fuzzy ELECTRE I method on consumers' evaluation of smartphone brand. The last section presents conclusions and future research directions.

II. METHOD

Decision making involves many criteria and subcriteria used to rank the alternatives of a decision (Saaty, 2008). MCDMs are used by decision makers to choose or rank alternatives depending upon an evaluation according to various criteria. Decisions are made based on trade-offs or compromises among some criteria that are in conflict with each other (Zhou et al., 2006). Classification of MCDMs can be seen in Fig. 2. Multiple Attribute Decision Making (MADM) methods choose an optimal alternative from a set of alternatives with respect to several evaluation attributes with different weights (Agarwal and Jain, 2013).

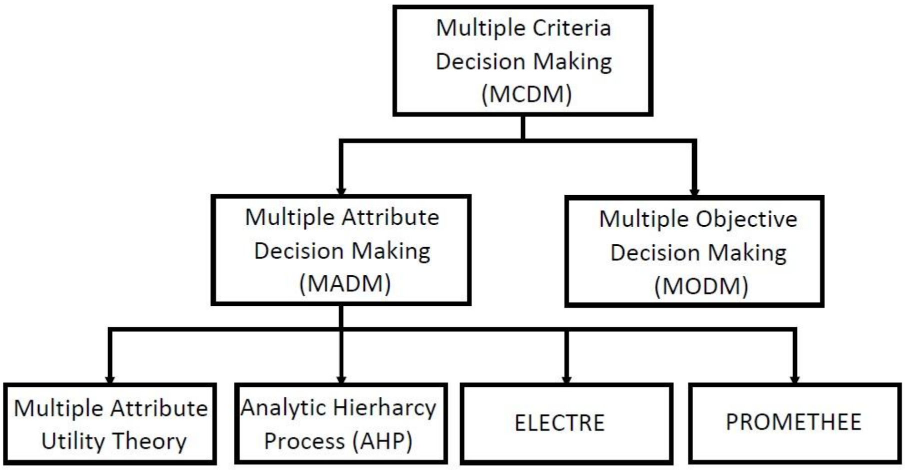

Figure 2 Classification of multiple-criteria decision making methods (Source. Zhou et al., 2006)

ELECTRE (ELimination Et Choix Traduisant la REalite), later named as ELECTRE I, is a widely using method among MADM methods. This method aims to find best alternative in consideration of several criteria. In other words, decision makers can select the best choice when maximizing advantage and minimizing conflict in the function of various criteria (Asghari et al., 2010). ELECTRE I outranks the alternatives with pairwise comparisons. Outranking relations are compared by using concordance and discordance indices (Wu and Chen, 2011). Three different outranking relations are defined in ELECTRE I method. These relations are listed as; preference (S), means "at least as good as; indifference (≈), means "not significantly different"; incomparable (?), means "not comparable".

The weights of criteria and the ratings of alternatives on each criterion are accepted as known precisely in MCDM. On the other hand, the judgements of decision makers about alternatives and several criteria are rarely reflected with linguistic variables. A linguistic variable is a variable whose values are words or sentences in a natural or artificial language (Zadeh, 1975). For example, height is a linguistic variable if it is defined as fuzzy variables such as "very short, short, tall or very short" rather than numbers. The usage of linguistic variables is usually in social sciences such as human decision processes, pattern recognition and psychology. To overcome the vagueness of linguistic variables, fuzzy sets and numbers are introduced by Zadeh (1975). Apart from the classical set theory, fuzzy sets allow partial membership of numbers. So, linguistic variables are not only defined as 0 or 1 but also are taken value between 0 and 1. Fuzzy Logic provide a simple way to arrive at a definite conclusion based upon vague, ambiguous and imprecise information (Agarwal and Jain, 2013). Fuzzy set theory resembles human reasoning in its use of approximate information and uncertainty to generate decisions (Kahraman et al., 2004).

Fuzzy ELECTRE I is a MADM method where fuzzy sets theory and ELECTRE I are merged into a new method. This method transforms linguistic variables to fuzzy numbers to handle uncertainty stemmed from decision makers. In Fuzzy ELECTRE I, both the weights of criteria and ratings of alternatives on each criterion are converted to fuzzy numbers. Generally, linguistic variables are represented by triangular fuzzy numbers (TFNs) because of their computational simplicity. TFNs are defined as (l, m, u) where these parameters means lowest value, medium value and upper value for linguistic variables. Thus, any linguistic variable is represented with triple values rather than single value.

The proposed Fuzzy ELECTRE I method follows several steps and these steps are describes as below. Suppose that our problem has a alternatives $(E_1, E_2, E_3, \dots, E_a)$ and b decision criteria $(F_1, F_2, F_3, \dots, F_b)$. Then, each alternative is evaluated with respect to these b criteria.

Step 1: Firstly, K number of decision makers are formed in the decision-making process $(D_1, D_2, D_3, \dots, D_K)$. DMs evaluate the weight of each criterion with a linguistic variable. Then, these linguistic variables are converted into fuzzy numbers (l, m, u). for $k = 1, 2, \dots, K$ and $j = 1, 2, \dots, b$ and the aggregated fuzzy importance weights can be determined follows;

$$\alpha_j^l = \min_k \{y_{jk}\} \; \alpha_j^m = \frac{1}{K}\sum_{k=1}^{K} y_{jk} \; \alpha_j^u = \max_k \{y_{jk}\}$$

(1)

After the determination of weights, the aggregated fuzzy importance weights are normalized as;

$$\widetilde{w}_j = \left(w_j^l, w_j^m, w_j^u\right) \tag{2}$$

where,

$$w_j^l = \frac{1/\alpha_j^l}{\sum_{j=1}^{n} 1/\alpha_j^l} \; w_j^m = \frac{1/\alpha_j^m}{\sum_{j=1}^{n} 1/\alpha_j^m} \; w_j^u = \frac{1/\alpha_j^u}{\sum_{j=1}^{n} 1/\alpha_j^u} \tag{3}$$

Lastly, the matrix of normalized aggregated fuzzy importance weight matrix is constructed as

$$\widetilde{W}_j = [\widetilde{w}_1, \widetilde{w}_2, \dots, \widetilde{w}_b] \tag{4}$$

Step 2: A decision matrix denoted by $X = \left(x_{ij}\right)_{axb}$ is formed with respect to each criterion.

$$X = \begin{bmatrix} x_{11} & \cdots & x_{1b} \\ \vdots & \ddots & \vdots \\ x_{a1} & \cdots & x_{ab} \end{bmatrix} \tag{5}$$

Step 3: The decision matrix $R = \left(r_{ij}\right)_{axb}$ is normalized by using calculating r_{ij}, which represents the normalized criteria value.

$$r_{ij} = \frac{x_{ij}}{\sqrt{\sum_{i=1}^{a} x_{ij}^2}} \tag{6}$$

$$R = \begin{bmatrix} r_{11} & \cdots & r_{1n} \\ \vdots & \ddots & \vdots \\ r_{m1} & \cdots & r_{mn} \end{bmatrix} \tag{7}$$

Step 4: Since each criterion has a different weight, the weighted normalized decision matrix is formed by multiplying the importance weights of criteria and the values in the normalized fuzzy decision matrix. $\tilde{V} = \left(v_{ij}\right)_{axb}$ for $i = 1, 2, \dots, a$ and $j = 1, 2, \dots, b$ where $v_{ij} = r_{ij} \; x \; \widetilde{w}_j$

$$V^l = \begin{bmatrix} v_{11}^l & \cdots & v_{1b}^l \\ \vdots & \ddots & \vdots \\ v_{a1}^l & \cdots & v_{ab}^l \end{bmatrix} V^m = \begin{bmatrix} v_{11}^m & \cdots & v_{1b}^m \\ \vdots & \ddots & \vdots \\ v_{a1}^m & \cdots & v_{ab}^m \end{bmatrix} V^u = \begin{bmatrix} v_{11}^u & \cdots & v_{1b}^u \\ \vdots & \ddots & \vdots \\ v_{a1}^u & \cdots & v_{ab}^u \end{bmatrix} \tag{8}$$

Step 5: In this step, the concordance indices and sets are calculated with using the weighted normalized fuzzy decision matrix and pairwise comparison among the alternatives, respectively. If p and q are two alternatives, the concordance index C_{pq} represents the pairwise comparison between p and $q(A_p \longrightarrow A_q)$. C_{pq} is the collection of attributes where A_p is better than or equal to A_q.

$$C_{pq}^l = \sum_{j^+} w_j^l \; C_{pq}^m = \sum_{j^+} w_j^m \; C_{pq}^u = \sum_{j^+} w_j^u \tag{9}$$

where j^+ are attributes contained in the concordance set C_{pq}.

Step 6: The discordance indices mean the disagreement in judgement between alternatives p and q $(A_p \longrightarrow A_q)$. D_{pq} represents that A_p is worse than or equal to A_q. The discordance indices are calculated as;

$$D_{pq}^l = \frac{\sum_{j^+}\left|v_{pj^+}^l - v_{qj^+}^l\right|}{\sum_j \left|v_{pj}^l - v_{qj}^l\right|} D_{pq}^m = \frac{\sum_{j^+}\left|v_{pj^+}^m - v_{qj^+}^m\right|}{\sum_j \left|v_{pj}^m - v_{qj}^m\right|} D_{pq}^u = \frac{\sum_{j^+}\left|v_{pj^+}^u - v_{qj^+}^u\right|}{\sum_j \left|v_{pj}^u - v_{qj}^u\right|} \tag{10}$$

where j^+ are attributes contained in the discordance set D_{pq}.

Step 7: The final concordance and discordance indices are computed as follows:

$$C_{pq} = \sqrt[z]{\prod_{z=1}^{Z} C_{pq}^{z}}\ D_{pq} = \sqrt[z]{\prod_{z=1}^{Z} D_{pq}^{z}} \qquad where\ Z = 3 \tag{11}$$

The final concordance and discordance indices are compared with the average concordance and discordance indices. The final concordance index should be larger than the average concordance index and the discordance index should be smaller than the average discordance index if there is a dominance relationship of alternative A_p over alternative A_q. This is represented by following equation procedure as $C_{pq} \geq \bar{C}$ and $D_{pq} \leq \bar{D}$.

Step 8: Finally, the net concordance and discordance indices are calculated to determine best alternative. Alternative with the minimum net concordance index and maximum net discordance index is the best alternative among all alternatives.

$$\tilde{C_i} = \sum_{i=1}^{a} C_{pq} - \sum_{i=1}^{a} C_{qp}\ \widetilde{D}_i = \sum_{i=1}^{a} D_{pq} - \sum_{i=1}^{a} D_{qp} \tag{12}$$

III. FINDINGS

The aim of this study is to evaluate the decision of consumers when selecting smartphones. We prepared an information form that includes several questions related to smartphones. This form is applied to 250 participants in data collecting process. For each smartphone brand, we considered their newest and best sale product and specified these products when collecting the data from participants. Participants specified their preferences about criteria and smartphone brands in linguistic terms. The importance weights of the five criteria and the performance of ratings are described by following linguistic terms: very low (5), low (4), medium (3), high (2), very high (1).

Data collecting process was performed in two main stages. In the first stage, we conducted a preliminary examination to 100 participants for determining the factors that may affect the decision of consumers in smartphone selection process. The factors were determined by semi-structured interviews with the participants, then a list of factors are formed. According to the participants, seven major factors directly affects smartphones selection process. These factors can be listed as; price, screen size, weight, ease of use, resolution, design and durability. These factors are partially similar to Isiklar and Buyukozkan (2007)'s study, where some of these factors are listed. Furthermore, in preliminary examination, we identified the five smartphone brands that firstly came into their minds with semi-structured interviews. Preliminary examination is analyzed with frequency analysis. The results show that Samsung is the most specified smartphone among participants. The other brands can be listed as: Apple, LG, HTC and Sony, respectively.

In the second stage, we extend our research and collect data from 250 participants. All factors are ranked from one to seven in terms of relative importance with respect to participants' responses. Each participant indicates his/her opinion about each criterion in smartphone selection process. In first step, we calculate aggregate fuzzy importance weights by using Equation 1. Then, normalized aggregate fuzzy importance weights of each factors is determined by Equation 3. Final values belongs to each criterion are shown in Table 2.

Table 2 Normalised aggregate fuzzy importance weights.

Criterion	w_l	w_m	w_u
Price	0,188	0,144	0,140
Screen size	0,188	0,163	0,140
Weight	0,060	0,102	0,140
Ease of use	0,188	0,163	0,140
Resolution	0,094	0,109	0,140
Design	0,188	0,191	0,160
Durability	0,094	0,128	0,140
Total	1	1	1

Participants evaluate the selection process of each smartphone brand with respect to each selection criterion in the second step. After collecting data, we average scores for each smartphone brand to determine the importance of each criterion for smartphone brands. Table 3 illustrates the average scores of smartphone brands with regard to criteria. While price, screen size and ease of use are most important factors for Samsung; weight, resolution, design and durability are dominant factors for Apple in selecting smartphones according to average scores.

Table 3 Decision matrix.

Smartphone Brands	Criteria						
	Price	Screen size	Weight	Ease of use	Resolution	Design	Durability
Apple	3,00	2,61	2,09	2,28	1,84	1,89	1,97
Samsung	2,27	1,97	2,44	1,86	2,47	2,46	2,64
LG	2,96	3,21	3,24	3,28	3,33	3,27	3,36
HTC	3,19	3,50	3,47	3,69	3,55	3,63	3,46
Sony	3,58	3,71	3,76	3,90	3,82	3,75	3,57

In step 3, the decision matrix is formed and the decision matrix is normalized by Equation 6. The normalized decision matrix values of each criteria are given in Table 4.

Table 4 Normalised decision matrix.

Smartphone Brands	Criteria						
	Price	Screen size	Weight	Ease of use	Resolution	Design	Durability
Apple	0,44	0,38	0,31	0,33	0,27	0,27	0,29
Samsung	0,34	0,29	0,36	0,27	0,36	0,36	0,39
LG	0,44	0,47	0,47	0,47	0,48	0,47	0,49
HTC	0,47	0,51	0,51	0,53	0,51	0,53	0,51
Sony	0,53	0,54	0,55	0,56	0,55	0,54	0,52

We calculated the weighted normalized decision matrix by using Equation 8 in step 4. Table 5 shows the weighted normalized decision matrix for each selection criterion.

Table 5 Weighted normalised decision matrix.

	Smartphone Brands	Price	Screen size	Weight	Ease of use	Resolution	Design	Durability
V^l	Apple	0,08	0,07	0,02	0,06	0,02	0,05	0,03
	Samsung	0,06	0,05	0,02	0,05	0,03	0,07	0,04
	LG	0,08	0,09	0,03	0,09	0,05	0,09	0,05
	HTC	0,09	0,10	0,03	0,10	0,05	0,10	0,05
	Sony	0,10	0,10	0,03	0,11	0,05	0,10	0,05
V^m	Apple	0,06	0,06	0,03	0,05	0,03	0,05	0,04
	Samsung	0,05	0,05	0,04	0,04	0,04	0,07	0,05
	LG	0,06	0,08	0,05	0,08	0,05	0,09	0,06
	HTC	0,07	0,08	0,05	0,09	0,06	0,10	0,06
	Sony	0,08	0,09	0,06	0,09	0,06	0,10	0,07
V^u	Apple	0,06	0,05	0,04	0,05	0,04	0,04	0,04
	Samsung	0,05	0,04	0,05	0,04	0,05	0,06	0,05
	LG	0,06	0,07	0,07	0,07	0,07	0,08	0,07
	HTC	0,07	0,07	0,07	0,07	0,07	0,09	0,07
	Sony	0,07	0,08	0,08	0,08	0,08	0,09	0,07

In step 5, the fuzzy concordance indexes are calculated for different weights of each criterion with Equation 9. Likewise, we calculated the discordance indexes by using equation 10 in step 6. In step 7, final indexes are calculated by equation 11 to determine outranking relations among alternative in smartphone brand selection. The immediate results are shown in Table 6 where the pairwise comparison are easily observed. We can illustrate these results in the decision graph which is presented in. This decision graph shows which action is preferable, incomparable or indifferent. According to Table 6, Samsung is preferred to LG, HTC and Sony; Apple is preferred to LG, HTC and Sony; LG is preferred to HTC and Sony; lastly, HTC is preferred to Sony. The ranking of smartphone brands are given in Table 7.

Table 6 The immediate results of Fuzzy ELECTRE I

Concordance and Discordance Indices	Final Index of $C(p,q)$	Final Index of $D(p,q)$	Outranking if $C(p,q) \geq \bar{C}$ or $D(p,q) \leq \bar{D}$	Outranking if $C(p,q) \geq \bar{C}$ and $D(p,q) \leq \bar{D}$
C(A,B) , D(A,B)	0,48	0,50		
C(A,C) , D(A,C)	0,16	0,99	(A,C)	(A,C)
C(A,D) , D(A,D)	0,00	1,00	(A,D)	(A,D)
C(A,E) , D(A,E)	0,00	1,00	(A,E)	(A,E)
C(B,A) , D(B,A)	0,51	0,49	(B,A)	
C(B,C) , D(B,C)	0,00	1,00	(B,C)	(B,C)
C(B,D) , D(B,D)	0,00	1,00	(B,D)	(B,D)
C(B,E) , D(B,E)	0,00	1,00	(B,E)	(B,E)
C(C,A) , D(C,A)	0,84	0,01		
C(C,B) , D(C,B)	1,00	0,00		
C(C,D) , D(C,D)	0,00	1,00	(C,D)	(C,D)
C(C,E) , D(C,E)	0,00	1,00	(C,E)	(C,E)
C(D,A) , D(D,A)	1,00	0,00		
C(D,B) , D(D,B)	1,00	0,00		
C(D,C) , D(D,C)	1,00	0,00		
C(D,E) , D(D,E)	0,00	1,00	(D,E)	(D,E)
C(E,A) , D(E,A)	1,00	0,00		
C(E,B) , D(E,B)	1,00	0,00		
C(E,C) , D(E,C)	1,00	0,00		
C(E,D) , D(E,D)	1,00	0,00		

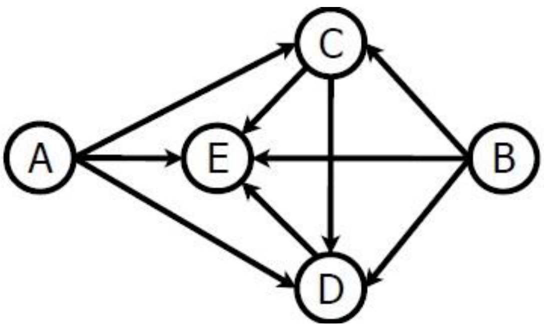

Figure 3 The decision graph of the problem

Finally, in step 8, the net concordance and discordance indexes are calculated to determine final decision. (Equation 12). Table 8illustrates the final result of smartphone brand selection. According to results of fuzzy ELECTRE I, Samsung is the most preferred smartphone brand with regards to specified criteria. Since considering global and local sales numbers, this is not an unexpected result. Moreover, this result also supports the immediate result where Samsung is preferred to other smartphone brands except Apple. This application shows that Fuzzy ELECTRE I is a useful tool for determining the decision process of consumers when selecting smartphone.

Table 7 Ranking results of Fuzzy ELECTRE I

Alternative	Incomparable Alternative	Submissive Alternative	Ranking
A	B	C, D, E	3
B	A	C, D, E	3
C	-	D, E	2
D	-	E	1
E	-	-	0

Table 8 Net Concordance and Discordance Indexes

Smartphone Brands	Net Concordance Index	Net Discordance Index	Final Decision
Apple	-2,72	2,99	-
Samsung	-2,97	3,11	+
LG	-0,31	0,02	-
HTC	2	-2	-
Sony	4	-4	-

IV. CONCLUSION

The results presented in this paper have addressed several managerial implications for marketing area. First, the measurement of consumers' evaluation toward products as the fourth stage which comes before the purchase decision in decision making process is a crucial issue to determine successful marketing strategies for companies. As consumers' evaluation is a very complex stage, companies put more effort into developing strategies for understanding it. Consumers' evaluation process can not be totally explained without linguistic variables which increase the uncertainty of this process. To overcome the uncertainty in consumers' evaluation, linguistic variables can be defined as fuzzy numbers. Fuzzy numbers easily capture subjective assessments of decision makers in consumer evalution process. Secondly, decision making process requires many criteria to evalute and select the best one among all alternatives. So, consumers' evaluation can be seen as a MCDM problem. MCDM methods may help decision makers to evaluate best alternative and decrease level of confusion in decision making process.

The main contribution of this study is to suggest a MCDM method, Fuzzy ELECTRE I, for the evaluation stage in the consumer decision making process. Fuzzy ELECTRE I merges fuzzy number theory and ELECTRE I into a new decision method in order to determine best alternative for decision makers. We apply Fuzzy ELECTRE I method in a real case, consumer evalution process on purchasing smartphones. First, a preliminary examination has been conducted over 100 participants. The results show that participants focus on 7 main criteria (price, screen size, heaviness, ease of use, resolution, design and durability) that directly affect the consumer evaluation process and top 5 smart phone brand (Samsung, Apple, LG, HTC and Sony) favoured by consumers. According to Fuzzy ELECTRE I results, Samsung is the most and Sony is the least preferable smartphone brands with regards to specified criteria. One possible extension of the paper is to consider different criteria such as performance, warranty and after sales services. The other possible extension is to implement different Fuzzy MCDM methods such as Fuzzy AHP and Fuzzy TOPSIS in consumer decision making process.

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