PRIMARY RESEARCH

Prioritization of Customers' Preferences in Islamic banking system: An Artificial Intelligence Approach using Kano Analysis

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Abstract.

Purpose: There are variety of factors that influence a customer's selection of a bank in general. However, there is a large gap in the literature that covers a customer decision to choose between an Islamic bank and a conventional one. To this end, we try to fill this gap by using a case study in Morocco to analyse factors contributing to a consumer's bank selection.

Methodology: The analysis presented in the paper is using a case in Morocco and applying an artificial intelligence method using KANO analysis. We apply it in three stages. First, customers preferences are identified and classified according to their impact on customer's satisfaction. Second, a Satisfaction Increasing Index (SII) is formulated. Third a Dissatisfaction Decreasing Index (DII) is formulated.

Findings: The analysis shows that Islamic banking attributes (Provision of profit-loss sharing financing , Operating on Islamic law and principles, Staff knowledge of Islamic banking, Provision of interest-free loans) are required by customers in selecting an Islamic bank as opposed to a conventional bank. However, these requirements do not necessarily contribute to increasing customers' satisfaction.

Significance: To the best of our knowledge, this is perhaps the first paper which uses a Kano analysis in the context of consumers selection of an Islamic or Conventional bank Research Limitations/Implications: This Paper has the main limitation of being conducted only in Morocco. It will be interesting to see how the results would change if the country context is changed.

Practical and Social Implications: The findings using these techniques, should help financial institution, whether it be Islamic or conventional banks to tailor their offerings to match consumers requirements.

KAUJIE Classification: L3,
JEL Classification: D12, N35

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INTRODUCTION

Islamic banks offer a wide range of banking products that are based primarily on profit and loss sharing (PLS), leasing or trading contracts, but most importantly are interest free (Aaminou & Aboulaich, 2017, Haque et al., 2009). These banking products could prove useful for enetrepreneurs having difficulty in finding funding due to requirements of high loan interest rates (De Aghion, 1999; Mia & Lee, 2017) or collateral requirements (Casamatta & Haritchabalet, 2014; Chen et al., 2009; Hellmann, 2007; Kirsch et al., 2009; Shane & Cable, 2002) for example in the case of profit and loss sharing contracts. However, despite these specific attributes, Islamic banks suffer from a strong competition not only from their fellow Islamic banks but also from other conventional banks (Naser et al., 1999, Rashid & Hassan, 2009).

This competitive environment is strengthened by the race towards satisfying an increasing level of customers' requirements. Indeed, in banking services, customer retention is key to business success, as it can spur an increase in financial performance (Ismail & Panni, 2009) given that satisfied customers often help attract new customers through positive referrals. Given the need to raise customers satisfaction, this study aims at analysing the factors that leads to customers selection of an Islamic bank as compared to a conventional one (Rashid & Hassan, 2009), more importantly around the prioritization of consumers requirements. In this race, Islamic banks strive and wish to find an alternative to every conventional product (Ayub, 2017). Naser et al. (1999) note that the bank selection criteria can affect the customer's satisfaction. Therefore, determining and prioritization the key factors of the customer satisfaction can help banks gaining more competitive advantages (Iranzadeh & Amlashi, 2013). So, several instruments are developed for to analyse the factors of customers' satisfaction (Pourhasomi et al., 2013). Examples include Quality Function Deployment (QFD) which is a service planning and development support method to assure quality and customer satisfaction (Akao, 2004). Another instrument is Analytical Hierarchy Process (AHP) which helps in decision makings that involve multi-criteria (Fong & Choi, 2000).

Understanding the bank selection process from a customer point of view helps banks adjust their planning and marketing strategies, attract new customers, and maximize the revenue generation (Aaminou & Aboulaich, 2017; Hasan et al., 2012; Pourhasomi et al., 2013) . As once said "A satisfied customer may tell one person but a dissatisfied customers will tell everyone they know" (Coleman Sr, 2014).

In this context a number of studies were conducted to identify the customers' requirements for selecting a specific bank. For example, it is shown that the highest priority pertains to "Showing enough consideration to the customers and lowering the waiting time for receiving the services" and the lowest priority is related to "Awareness and expertise of bank staff and manager in responding to the customers' needs" (Pourhasomi et al., 2013). Another example highlights the relevance of the religious conviction, reputation, service quality and pricing in the use of Islamic banks (Gait & Worthington, 2008). A further study shows that selection of an Islamic banks is related to customers positive attitudes towards them (Aziz et al., 2018).The study recommends that this positive attitudes could be created through positive campaigns.

When it comes to the consumer's selection process, Aaminou and Aboulaich (2017) note that this is determined by two factors categories: Bank-related factors and Consumer-related factors. This study focuses mainly on the bank related factors, and how they affect the customers' bank selection. In our quest to find the different factors affecting customers choice a good number of characteristics emerged through analysis of previous studies covering customers bank selection. We categories these studies in terms of high , medium and low literature coverage.

- Bank reputation: (Aaminou & Aboulaich, 2017; Erol & El-Bdour, 1989, Erol et al., 1990; Gait & Worthington, 2008; Gambo, 2012; Haque et al., 2009; Hasan et al., 2012; Naser et al., 1999; Naveed, 2010; Pourhasomi et al., 2013).

- General facilities provided by the bank (such as online banking, ATM facilities, parking): (Bandyopadhyay, 2015; Erol & El-Bdour, 1989; Erol et al., 1990; Gambo, 2012; Hasan et al., 2012; Haque et al., 2009; Naveed, 2010; Naser et al., 1999; Pakizehkar et al., 2016; Pourhasomi et al., 2013).

- Number of branches, branch proximity and location: (Aaminou & Aboulaich, 2017; Bandyopadhyay, 2015; Erol & El-Bdour, 1989; Erol et al., 1990; Gait & Worthington, 2008; Gambo, 2012; Hasan et al., 2012; Naser et al., 1999; Naveed, 2010).

- Staff behavior: (Bandyopadhyay, 2015; Gambo, 2012; Erol & El-Bdour, 1989; Erol et al., 1990; Hamzah et al., 2015; Haque et al., 2009; Hasan et al., 2012; Naser et al., 1999; Naveed, 2010; Pourhasomi et al., 2013).

- Expertise and skills: (Gait & Worthington, 2008; Gambo, 2012; Haque et al., 2009; Naser et al., 1999; Naveed, 2010; Pourhasomi et al., 2013).

- Competitive service charges: (Aaminou & Aboulaich, 2017; Bandyopadhyay, 2015; Erol & El-Bdour, 1989; Erol et al., 1990; Gait & Worthington, 2008; Gambo, 2012; Hasan et al., 2012; Naser et al., 1999; Naveed, 2010).

- Fast and efficient service: Aaminou and Aboulaich (2017), Erol and El-Bdour (1989), Erol et al. (1990), Gambo (2012), Gait and Worthington (2008), Haque et al. (2009), Hasan et al. (2012), Naser et al. (1999), Naveed (2010) and Pourhasomi et al. (2013)

- Customer security, privacy and confidentiality: Aaminou and Aboulaich (2017), Erol and El-Bdour (1989), Erol et al. (1990), Haque et al. (2009), Hasan et al. (2012), Naveed (2010), Naser et al. (1999) and Pourhasomi et al. (2013).

On the other hand, a moderate number of literatures considers the following factors of high importance.

- Bank's obedience to Islamic banking principles: Aaminou and Aboulaich (2017), Gait and Worthington (2008), Gambo (2012) and Naveed (2010).

- Wide range of services: Erol and El-Bdour (1989), Erol et al. (1990), Gambo (2012), Hasan et al. (2012), Naser et al. (1999) and Naveed (2010).

- Competitive rate of return: Aaminou and Aboulaich (2017), Gait and Worthington (2008), Hasan et al. (2012), Naser et al. (1999) and Naveed (2010).

TABLE 1
Numerical Illustration of the Bootstrapping process

Bank Selection Criteria	N Literature	%
1 Provision of profit-loss sharing financing	2	1.7
2 Operating on Islamic law and principles	5	4.2
3 Staff knowledge of Islamic banking	1	0.85
4 Bank reputation and image	11	9.4
5 Provision of investment opportunities	1	0.85
6 General facilities (online banking service...)	11	9.4
7 The number of branches (Branch proximity, Branch location)	10	8.5
8 Competitive cost of financing	1	0.85
9 Friendly and polite behaviours of staff	13	11
10 Clean and comfortable environment	3	2.5
11 Wide range of services	7	6
12 Expertise and skills of the staff	9	7.7
13 Competitive Return rate	6	5
14 Competitive Service charges	10	8.5
15 Provision of free interest loans	1	0.85
16 Particular Appearance personnel	2	1.7
17 Particular External appearance of bank	4	3.4
18 Fast and efficient service	11	9.4
19 Customer security, privacy and confidentiality	9	7.7

Furthermore , a small number considers Islamic attributes of Islamic banks to be of high importance in bank's selection:

- Staff knowledge of Islamic banking: Gambo (2012).

- The provision of profit and loss sharing contracts: Gait and Worthington (2008) and Naveed (2010).

- Clean environment: Hasan et al. (2012), Pourhasomi et al. (2013) and Sarabi and Taleghani (2015).

- Appearance of staff: Gambo (2012) and Pourhasomi et al. (2013).

- The provision of investment activities: Naveed (2010).

- Competitive cost of financing i.e a Lower customer's financing cost: Aaminou and Aboulaich (2017).

- Interest-free loan: Rashid and Hassan (2009).

Finally, regardless of the type of the bank (Islamic or conventional), a small number of literature considers external appearance of banks to be of high importance Erol and El-Bdour

(1989), Erol et al. (1990), Gambo (2012) and Hamzah et al. (2015).

The following table summarize our literature review and rank bank selection factors in terms of literature coverage.

One important remark in this literature coverage, is that Islamic banking attributes are not widely covered in the same way as the general bank's attributes. In fact, staff knowledge of Islamic finance, and, surprisingly, provision of interest free loans are ranked last in the literature and theretofore could, possibly, be not a major consideration in Islamic bank's selection.

Given the variety of factors that come into consideration when selecting a bank, several methods have been developed for deeper understanding of customers' requirements and preferences (Meng et al., 2015). Examples include Quality Function Deployment (QFD) which is a service planning and development support method to assure quality and customer satisfaction (Akao, 2004). Another instrument is Analytical Hierarchy Process (AHP) which helps in multi-criteria decision making (Fong & Choi, 2000). In our context, we use Kano's model as a customer-driven tool that shown successful result in attaining the aforementioned objectives (Meng et al., 2015). The rest of the paper will proceed a s follows: Section 2, represents a description of the Kano model , and sample and data collection. Section 3 Represents the results. Section 4 concludes with summary of findings and further venues of extensions.

Kano's Two-dimensional Buality Model

Taking into account the customer needs and preferences in banking industries is a key factor for institutions' survival and growth Eshlaghy et al. (2011). To this end, Kano model is an effective tool for understanding and categorizing customer preferences according to their impact on customer satisfaction. It is a very useful tool for quality management and business planning. The model classifies customers' needs on three categories represented in a two-dimensional graph according to needs fulfilment and satisfaction (see figure 1):

FIGURE 1. Kano's Two-Dimensional Quality Model

According to the Kano's model three requirements has to be satisfied for customer to make a selection:

- Must-be-quality: Meeting the requirements under the underline group do not contribute significantly toward customer satisfaction. However, if they are not fulfilled correctly, thy cause dissatisfaction.

- One-dimensional needs: When fulfilled, they satisfy customers, but non-fulfilment result in customers' dissatisfaction.

- Attractive needs: Not meeting the requirements under this group do not lead to customer dissatisfaction. Nevertheless, satisfying them contributes to customer excitement and provide competitive advantages.

Kano's model help in assessing customer feelings regarding the presence and the ab-sence of a particular product/service attribute Bandyopadhyay (2015). In other words, it helps in measuring the customers satisfaction (dissatisfaction) when a product/service/attribute is presents (absent).

Sample and Data Collection

An analysis of extant literature shows that few studies have considered adherence to Is-lamic values as an important factor for consumers in their selection of Islamic banks. So, our questions will focus only on the consideration linked to Islamic banking adherence. The KANO questionnaire we have prepared contains both functional and dysfunctional questions. A Functional question evaluates the consumer's reaction when the requirement is met. While the dysfunctional question captures the feeling of customer when the requirement was not considered. For example, for the item "The personnel awareness of Islamic banking principles", the question is formulated as follows:

1) Functional: How do you feel if the personnel of the Islamic bank have a good knowl-edge in Islamic banking principle?"
2) Dysfunctional: How do you feel if the personnel of the Islamic bank do not have a good knowledge in Islamic banking principle?"

The respondents have five options to express their feelings: "a- I like it that way b- I expect it to be that way c- I am neutral d- I live with it that way e- I dislike it that way". The questionnaires are analysed by an evaluation table (2) to classify the customers' requirements into Kano categories Bandyopadhyay (2015).

In addition to must be (M), one-dimensional (O) and attractive requirements (A), the evaluation table contains indifferent (I), reverse (R) and questionable attributes (Q) as well. Customer satisfaction is not influenced by the presence or absence of indifferent attributes. The existence of reverse attributes can cause customer dissatisfaction while the questionable attributes demonstrate that the question is described incorrectly, or the participant response is illogical (Ilbahar & Cebi, 2017).

TABLE 2
Kano's Two-Dimensional Quality Model

Service Quality Elements	Dysfunctional				
	Like	Expect	Neutral	Accept	Dislike
Functional Like	Q	A	A	A	O
	R	I	I	I	M
	R	I	I	I	M
	R	R	R	R	Q

Note= A: Attractice; O: One-Dimentional; M: Must-be; I: Indifferent; R: Reverse; Q: Questionable

In order to determine the Kano category (A , O , M) we use the highest response frequency as used by (Lin et al., 2017). Indeed, items with the highest frequency represent dominant customer views, thereby determining the categories (A, O ,M) with which to organize attributes (Chen, 2012). For each requirement, we generate a cross tabulation table. In order to determine the Kano category (A , O , M) we use table 2. The category with the highest response frequency is to be selected (Lin et al., 2017).

Beside the customers' preferences classification, two customer satisfaction coefficients (Berger et al., 1993) i.e SII and DDI are calculated. SII scores represent the situation in which, any improvement in the pertinent element of services quality will cause an increase in customer satisfaction. On the other hand, If SII value for any of the element of service quality is closer to 0, it will depict that effect is low, and likewise, if the value is closer to 1, it will indicte that the element of service quality is positively influencing customer satisfaction. DDI scores are indicative of the situation that if any element service quality is either improved or not provided, it will diminish the customer satisfaction. The effect of element is low, if DDI value for an element falls closer to 0, and if it is close to -1, it means that the customer satisfaction will be decreased by the the provision/improvement of the element of service quality. A low DDI will dissatisfy the customers. Formulas for calculating SII and DDI (Berger et al., 1993) are given as follow:

$$SSI = \frac{A + O}{A + O + I + M} \tag{1}$$

$$DDI = \frac{A + O}{A + O + I + M} \tag{2}$$

Where A is the attractive quality, O the one-dimensional quality, M they must be quality; I the indifferent quality (Bandyopadhyay, 2015). Kano categories are used to calculate customer satisfaction (CS) coefficient in terms of satisfaction increasing index (SII); and the dissatisfaction decreasing index (DDI) in line with (Berger et al., 1993). This enables the researcher to priori¬tize service quality determinants and understand their importance to managerial decision making (Bandyopadhyay, 2015). An online questionnaire is used for collecting data. 246 complete ques-tionnaires were selected.

RESULTS

The summary statistics of the respondents are reported in table 3:

TABLE 3
Summary Statistics

Bank Selection Criteria	N Literature	%
Gender	Male	54
	Female	46
Age	161<30 years	65.44
	69 : 31-40	28.04
	11 : 41-50	4.44
	5 : >50	2.03
Education	1 Middle school	0.4
	1 High School	0.4
	244 College	98.2
Income	50 < 5000	20.03
	38 : 5001-8000	15.4
	54 : 8001-12000	22
	46 : >12000	18.7
	58 Without revenue	23.5
Intention to be an Islamic banking customer l	89: Yes	36.17
	10 : Never	4.06
	100 : May be	40.6
	47 : I do not know	19.1
Intention to be an Islamic banking customer l	89: Yes	36.17
	10 : Never	4.06
	100 : May be	40.6
	47 : I do not know	19.1
Knowledge about Islamic banking products	36: Very Good	14.36
	80 : Good	32.5
	103 : Moderate	41.9
	27 : Nothing	10.9
Having an account in a Moroccan bank	220: Yes	89.4
	26 : No	10.6
Family Situation	84:Married: Yes	34.14
	155 : Single	63
	7 : Other	2.84

The internal consistency of the questionnaire is confirmed by Cronbach's alpha coeffi-cient equaled to 0.793 (Nunnally, 1978). SPSS software is used for analysing the collected data.If the values are found to be greater than 0.70, reliability scores are acceptable (Nunnally, 1978). based on the consistency of the data using the Cronbach's alpha coefficient equaled to 0.793 , we can have the following Kano's results:

Question	Male	Female	Whole sample
1	M	M	M
2	O	O	O
3	M	O	M
4	O	O	O
5	A	O	O
6	O	O	O
7	O	O	O
8	O	M	O
9	M	O	M
10	M	O	M
11	A	O	O
12	O	M	O
13	O	O	M
14	O	O	O
15	O	O	O
16	I	I	I
17	I	I	I
18	O	M	O
19	M	O	M

FIGURE 2. Kano Categorization of Cus-tomers' Preferences

Question	Male	Female	Whole sample
1	0.007	0.29	0.004
2	0.5	0.53	0.52
3	0.39	0.52	0.455
4	0.57	0.61	0.589
5	0.68	0.699	0.691
6	0.62	0.663	0.642
7	0.59	0.65	0.621
8	0.58	0.56	0.577
9	0.36	0.371	0.369
10	0.007	0.451	0.004
11	0.60	0.628	0.613
12	0.47	0.495	0.483
13	0.57	1/113	0.004
14	0.58	0.53	0.56
15	0.58	0.53	0.56
16	0.11	0.04	0.08
17	0.09	0.07	0.085
18	0.68	0.707	0.695
19	0.38	0.433	0.406

FIGURE 3. SII Score for each item of Islamic Bank Selection

Question	Male	Female	Whole sample
1	-0.32	-0.36	-0.53
2	-0.39	-0.35	-0.45
3	-0.45	-0.32	-0.39
4	-0.23	-0.28	-0.25
5	-0.08	-0.12	-0.10
6	-0.18	-0.16	-0.17
7	-0.12	-0.15	-0.13
8	-0.19	-0.24	-0.21
9	-0.4	-0.46	-0.43
10	-0.16	-0.19	-0.17
11	-0.17	-0.15	-0.16
12	-0.39	-0.45	-0.41
13	-0.19	-0.15	-0.17
14	-0.19	-0.23	-0.21
15	-0.2	-0.29	-0.24
16	-0.06	-0.079	-0.07
17	-0.08	-0.07	-0.07
18	-0.007	-0.008	-0.21
19	-0.54	-0.51	-0.53

FIGURE 4. DDI Score for each item of Islamic Bank Election

One Dimentional Quality

2 , 4 , 5 , 6 , 7 , 8 , 11 , 12 , 14 , 15 , 18

16 , 17

Indifferent Quality

Must be Quality (M)
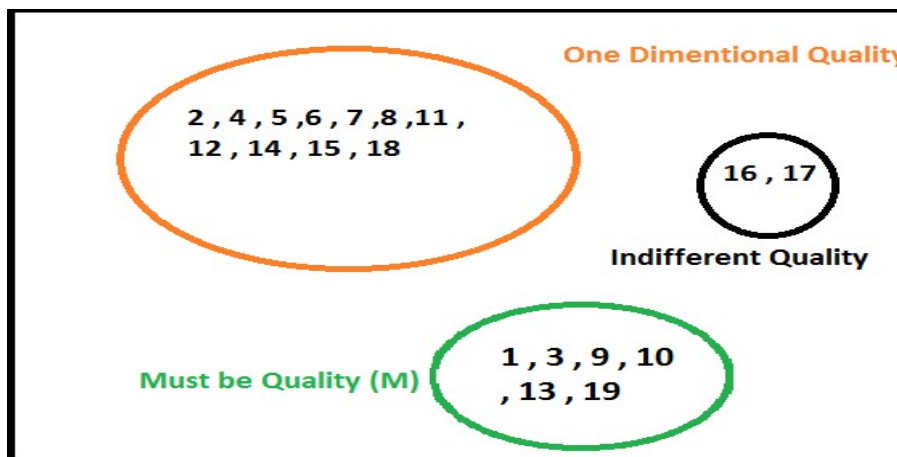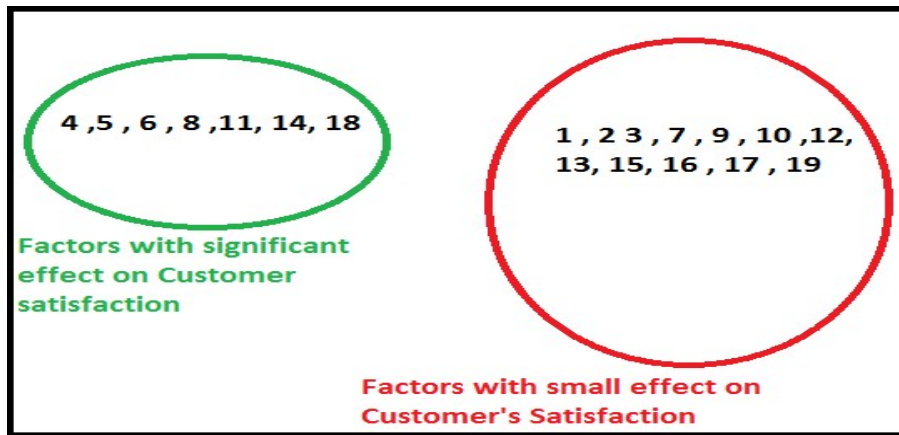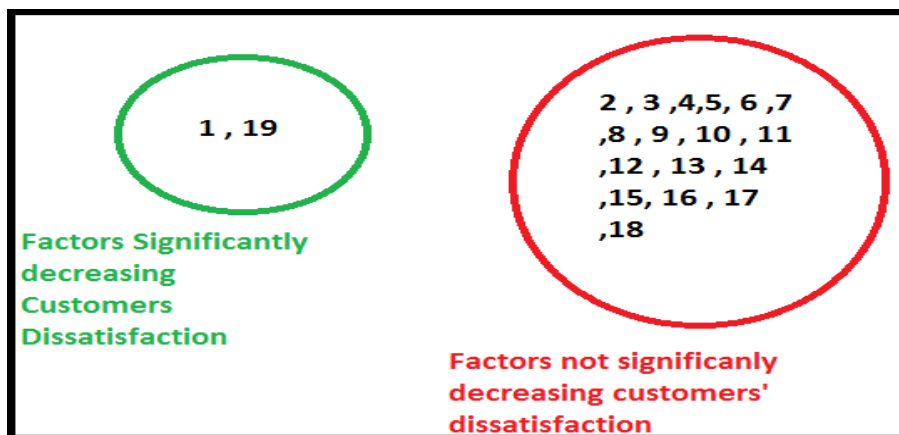
1 , 3 , 9 , 10 , 13 , 19

FIGURE 5. Kano Categorization of Customers' Preferences

FIGURE 6. Summary of SII Framework Results

FIGURE 7. Summary of DDI Framework Results

Figure 2 and Figure 5, illustrate the customers preferences when it comes to Islamic Bank Selection using Kano categorization framework.

The whole sample was indifferent to (16) and (17). They represent 'Particular Appear¬ance of personnel' and 'Particular Appearance to bank'. On the other hand The whole sample considered (1) , 3 ,9 , 10 , 13 , 19 as a must be quality in a bank. they represent: Provision of profit-loss sharing financing, Staff knowledge of Islamic banking, Friendly and polite behaviours of staff , Clean and comfortable environment , Competitive Return rate , Customer security, privacy.

As far the One dimensional quality consideration , The whole sample selected: 2 , 4 , 5, 6 , 7 , 8 , 11 , 12 , 14 , 15 , 18. They represent : Operating on Islamic law and principles, Bank reputation and image , Provision of investment opportunities , General facilities (online banking service...) , The number of branches(Branch proximity, Branch location) , Competitive cost of financing, Wide range of services , Expertise and skills of the staff, Competitive Service charges , Provision of free interest loans, Fast and efficient service. When it comes to the specific considerations taken in selecting an Islamic bank we would focus on (1) : Provision of profit-loss sharing financing , (2) : Operating on Islamic law and principles , (3) : Staff knowledge of Islamic banking , and (15) :Provision of free interest loans.

We can see that these considerations are important whether they are a must be consideration for (1) and (3) or one dimensional for (2) and (15). We can see that an Islamic bank must fulfil all these 4 attributes as their non-fulfilment can cause customers dissatisfaction. Fulfilment of 1 and 3 does not increase satisfaction on the other hand fulfilment of (2) and (15) results in an increase in satisfaction. The whole sample is not different from the male and female preferences except for 'staff knowledge of Islamic banking (3) , where females are having a one dimensional preference. In other words, females are more dissatisfied than man if they face up to staff lacking Islamic banking knowledge.

To see the extent of satisfaction that the fulfilling of (1) (2) (3) and (15) may cause we refer to Figure 3 and Figure 6, that illustrate the SII score and. It shows 'factors with significant effect on customers satisfaction' and ' Factors with insignificant effect on customer's satisfaction. As far as the Islamic attributes consideration in selecting an Islamic bank, we find 1 ,2 3 , 15 have small effect on customers satisfaction. this shows that they are seen as a normal practice of Islamic banking rather than being a distinctive feature. This means, that it is normal that when a consumer approaches an Islamic bank for services, they expect these attributes to exist anyway. Since these attributes do not apply to a conventional bank, there is no expectations from such a bank to fulfil them. Therefore, not fulfilling those attributes by a conventional bank would not have an impact on consumers satisfaction.

The whole sample analysis is not different from the gender analysis as both males and females have closely similar SII scores across the Islamic attributes. To see the extent of dissatis¬faction that the non-fulfilling of (1) (2) (3) and (15) may cause we refer to Figure 7 and Figure 4, that illustrate the DII score and. It shows 'factors with that significantly reduce customers dissat-isfaction' and ' Factors that do not significantly reduce customer's satisfaction. We can see that only (1) is significantly reducing customers dissatisfaction while 2 , 3 ,15 do not. Furthermore, the whole sample analysis shows that both male and females are not different as they both show closely similar DII score across the Islamic attributes.

By taking Figures 2-7, we can categories the Islamic consideration attributes among other attributes when comes into a bank selection. We are able to see, that even though some attributes (Provision of profit and loss (1) , Staff knowledge of Islamic banking (3)) are seen as must be qualities and others (Operating on Islamic law and principles (2) , Provision of interest-free loans (15) , they themselves do not contribute to an increase in customers satisfaction or a decrease to customer dissatisfaction. This means that they are considered as a normal practice that must be carried out by any Islamic bank.

Conclusion

In this study we tried to provide a prioritisation of customer preferences in Islamic bank¬ing system. To this end, we have used an artificial intelligence framework using a KANO's Model Analysis in three stages. First customers preferences are identified and classified according to their impact on customer's satisfaction. Second, a Satisfaction Increasing Index (SII) is calculated. Third a Dissatisfaction Decreasing Index (DII) is calculated. Our findings show that Islamic banking at¬tributes are required by customers in selecting an Islamic bank as opposed to a conventional bank. However, the findings show that the Islamic attributes in

Islamic bank selection (Interest-free rates, PLS contracts, and staff knowledge of Islamic banking) , do not give Islamic banks and edge when it comes to the customer's bank selection. This means that to improve customers attractiveness, Islamic banks need to consider other factors in the same way that conventional banks do.

This study can be further extended in a number of ways. In this study we have used Kano analysis to prioritize customer's preferences. Another study could use AHP analysis which is a multi-criteria programming used for decision making in complex environments in which many variables or criteria are considered in the prioritization and selection. The finding s could be contrasted with our Kano's finding. Other ways of extension is to simulate the data collected in fuzzy logic framework which allows for simultaneous interference of customer's banks selection criteria. Another venue of extension could deal with extending the study to different countries with different cultural settings. Extending the study to different countries could enable a cross country analysis to ascertain the findings or propose adjustments to the Kano model.

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