Classifying Customer Attributes with Importance Performance Analysis and Fuzzy Kano

Elia Oey[1]*, Nyimas Revita Permaisuri Putri[2], and Benyamin Suwito Rahardjo[3]
[1–3]International Business Management Program, Management Department,
BINUS Business School Undergraduate Program, Bina Nusantara University
Jakarta 11480, Indonesia
Email: [1]eliaoey@binus.ac.id, [2]nyimas.putri@binus.ac.id, [3]benyamin.suwitorahardjo@binus.ac.id

Abstract—Analyzing what consumer needs remains every day's challenge for every business. Every business entity requires continuous effort as consumers become more demanding and have more access to product/service offerings, leading to more competitive market dynamics and the necessity for more innovative ways of offering products/services. The research aims to recommend a set of customer attributes for the studied company and analyze the selected attributes using a combination of Importance Performance Analysis (IPA) and fuzzy Kano. The research is a case study of a company selling gift vouchers for individual and corporate consumers. The research combines literature study and affinity diagram workshop to identify the required consumer attributes, which are analyzed using the integration of IPA and fuzzy Kano. The results suggest that the studied company should concentrate on several attributes, such as A7-simple requirement during the purchasing process, A10-no administration fee during purchase, A14-cross promotion with various sister brands, and A15-no minimum purchase. The attributes fall under "concentrate here" in the IPA grid while at the same time, those are considered as "effective improving area" in the fuzzy Kano grid. The studied company is also recommended to keep their good work on the attribute of A5-expiry date longer than one year so that it remains their competitive attribute and does not fall into the other inferior quadrants.

Index Terms—Customer Attributes, Importance Performance Analysis (IPA), Fuzzy Kano

I. INTRODUCTION

GIFT vouchers have had a robust and healthy demand over the years. They are popular because they give the recipient flexibility while at the same time offering convenience to the purchasers. The consumers of gift vouchers are not only individuals but also companies and institutions. Companies are also eager to sell gift vouchers for their products and brands. They can benefit from higher brand awareness, extend sales to the holiday season, enhance customer engagement, capture customer purchasing behavior data, provide easier distribution, and enhance cash flow. In 2020, the global gift vouchers market was estimated at US$767.4 Billion and is projected to have a Compounded Annual Growth Rate (CAGR) of 11.1%, reaching US$1.4 Trillion by 2026 [1].

This phenomenon also exists in Indonesia. The gift voucher market in Indonesia enjoyed a CAGR of 11.4% during 2018–2022. Additionally, this industry is projected to continue to grow in Indonesia and is forecasted to have a CAGR of 9.3% during 2023–2027. Corporate's spending on gift vouchers also drives further growth for the Indonesian market. Big corporation in Indonesia widely uses gift vouchers as rewards and incentives for their employees. Leading food and beverage retailers even customize their gift cards for their corporate consumers [2].

Despite its potential, previous studies stress more on what motivates people to use gift vouchers more than giving actual products or cash [3–5]. The equally important factor is what kind of gift vouchers are needed and expected from consumers. Given this background, it is crucial for gift voucher providers to understand what attributes they need to address in their gift vouchers. Gift vouchers are a combination of service and product and have a unique role in consumer purchase transactions. Hence, it requires a different set of attributes. The research is a case study of a prominent gift voucher provider in Indonesia. It aims to recommend a set of customer attributes for the studied company and analyze the selected attributes using a combination of Importance Performance Analysis (IPA) and fuzzy Kano, so the studied company can tailor their strategy accordingly.

The novelty of the research lies in the unique product studied, the gift voucher. By analyzing the essential and

relevant attributes of gift vouchers, business entities can design and tailor gift vouchers as another product offering and marketing tool. Although the research result is limited to the company studied, the result can also be used and replicated in other business entities engaged in gift vouchers.

II. RESEARCH METHOD

The research combines a literature study and affinity diagram to finalize the attributes. The literature review collects possible and relevant attributes for gift voucher context from previous relevant and similar studies. These two methods take into account theoretical insight from previous studies as well as pragmatic input from the stakeholders studied. For analysis, the research applies Importance Performance Analysis (IPA) and fuzzy Kano. The Kano method is enriching but requires a tedious survey. Incorporating fuzzy elements into the Kano method also accommodates realistic respondents' vagueness but adds complexity to the survey. Nevertheless, the research decides to do it as only a few recent studies have utilized it, as indicated by systematic literature studies [6].

A. The Power of Affinity Diagram Workshop in Deriving Customer Attributes

Different approaches with their merits are available and used by different scholars to capture what customers really want. The research gathers customer attributes by performing literature studies from previous research on the same topics or area to save exploration time. Nevertheless, the result will be stronger if the research involves a panel of experts or customers in finalizing those attributes. This situation is where the affinity diagram workshop has its advantage.

Kawakita Jiro introduced the affinity diagram in the 1960s as a management tool for group consensus decision-making for subjective qualitative data. Constructing an affinity diagram in a workshop of several experts brings systematic data cleansing and grouping to a set of qualitative data [7, 8]. During the workshop, experts are asked to group a set of customer attributes into a meaningful and manageable number of groups. During the exercise, the grouping is done using sticky notes and is first done in silence individually. Afterward, a discussion between experts is done for finalization and agreement. Opinions from various experts are collected in one setting and can accommodate individual and group decisions using this approach.

With the rationale mentioned earlier, the research combines a literature review and affinity diagram workshop to derive a set of customer attributes for the studied company. In the literature review, the research collects the possible and relevant attributes of gift vouchers. Those possible attributes are brought into an affinity diagram workshop. In the workshop, stakeholders from the studied company are asked to reduce them into a set of relevant attributes to the company.

B. Importance Performance Analysis (IPA)

Martilla and James first introduced IPA in 1977 [9]. The concept is simple and pragmatic, resulting in vast applications by researchers in many areas and across the industries, such as in categorizing key performance indicators [10], identifying critical success factors [11], or studying consumer behavior in various areas [12–14]. With IPA, the factors/criteria/attributes are evaluated regarding the degree of importance and perception/performance. Based on these two terms, the research can plot each factor/criterion/attribute into a 2×2 quadrant, using the average number as the borderline between quadrants. Then, strategies can be elaborated and focused on each quadrant. IPA proposes four different strategies for each quadrant: (1) "concentrate here" in quadrant 1 where the degree of importance is high while the degree of performance is low, (2) "keep up the good work" for quadrant 2 where both degrees of importance and performance are high, (3) "low priority" for quadrant 3 where both degrees of importance and performance are low, and (4) "possible overkill" for quadrant 4 where the degree of performance is high while the degree of importance is low [9].

C. (Fuzzy) Kano Model

Dr. Noriaki Kano developed the Kano model to help organizations to analyze customers' preferences and the attributes of goods or services that could address customer satisfaction or dissatisfaction [15]. In short, the Kano model utilizes a two-dimensional approach to measure customers' perceptions, i.e., satisfaction (positive) or dissatisfaction (negative) in responding to each attribute [16]. Figure 1 shows the non-linearity of customer satisfaction/dissatisfaction for certain attributes, which is the superiority and pragmatism of the Kano model [17, 18]. According to Kano, five attribute classifications are depicted in Fig. 1 [19, 20].

1) Must-be (M) attributes. This category consists of attributes with the most basic criteria. Customers are very dissatisfied if this category is not met. However, even though these attributes have been met, customer satisfaction remains the same because customers think these criteria are a must to have.
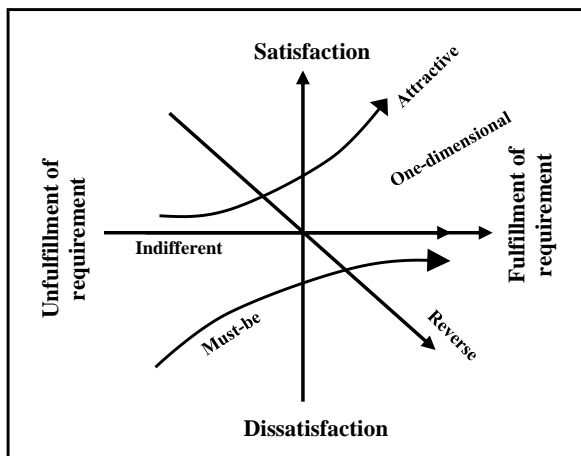
Fig. 1. Kano model [19].

2) One-dimensional (O) attributes. The presence of attributes in this category increases the level of satisfaction and vice versa. These attributes make customers give loyalty to the company.

3) Attractive (A) attributes. Attributes in this category are the ones giving a competitive advantage to the company in comparison to its competitors. When it is present, attributes in this category give truly positive satisfaction. However, if the attributes in this category are not met, it does not reduce customer satisfaction.

4) Reverse (R) attributes. Attributes in this category should be excluded from a product because the function of the attributes in this category harms customer satisfaction. However, their absence actually provides benefits.

5) Indifferent (I) attributes. The attributes in this category do not result in significant customer satisfaction regardless of whether the attributes in this category are met or not met in the product.

The fuzzy theory was first introduced by Zadeh, aiming to address the hidden uncertainty and ambiguity in human judgments defined by functions and assign a membership degree from zero to one [21]. By introducing a fuzzy element into the Kano model, the research addresses the possibility of vagueness in customers' feelings during their evaluation by rationalizing the calculation of the number of degrees of possibility when choosing between "like", "must-be", "neutral", "live-with", and "dislike". While the traditional Kano model is less specific in processing human uncertainty, the fuzzy concept included in the Kano model is considered to accommodate the linguistic properties of subjective and fuzzy human perception [22].

Once each attribute is assigned to the Kano category,

the next step is to calculate two Kano satisfaction coefficients, which express customer delight and disgust [23]. The calculations use Eqs. (1) and (2). The value of CS1 and CS2 for each attribute can be plotted into a 2×2 quadrant. The observation typically focuses on the "effective improvement area" located at the high CS1 and low CS2 quadrants, with the average value set as the boundary between the high and low quadrants [23]. The equations can be seen as follows.

$$\text{Customer Delight (CS1)} = \frac{(A + O)}{(A + O + M + I)}, \quad (1)$$

$$\text{Customer Disgust (CS2)} = \frac{-(O + M)}{(A + O + M + I)}. \quad (2)$$

D. Integration of Importance Performance Analysis (IPA) and Kano Model

There are two possibilities on how to integrate IPA and Kano model. The first possibility is to introduce different new categories based on a combination of the degree of importance (high/low) vs. degree of performance (high/low) vs. three important Kano categories (O, A, and M). It results in 12 different strategy areas [24].

Another simpler possibility is to integrate the Kano's Customer Satisfaction (CS) grid with the IPA grid and concentrate on attributes belonging to the "effective improvement area" in the Kano CS grid and the "concentrate here" or "keep up the good work" quadrant in the IPA grid. Most studies use this approach with few modifications [25].

Both approaches have their merits and flaws. The first approach has advantages, especially for attributes with an attractive Kano category [23]. This first approach further distinguishes into strategy subsets for each of the three main Kano categories. On the other hand, when all of the attributes fall under the "one-dimensional" Kano category (as in most cases), the second approach gives a better analysis.

For the IPA and fuzzy Kano analysis, data are collected using probability sampling from the existing consumers of the studied company. Data collection is done by distributing closed questionnaires to samples of existing consumers from the studied company. There are 5,319 existing consumers at the time of the research. The research aims for a minimum number of 98 respondents using the Slovin formula and with a 10% error. However, in the end, the research gets 100 responses.

The questionnaire consists of three sections as follows. First, there are some questions related to the respondents' profiles. Second, for addressing IPA analysis, respondents are asked to rate attributes' importance and their perception of the performance of the studied

TABLE I
LIST OF SELECTED CONSUMER ATTRIBUTES.

Product Features	Purchasing Process	Unique Selling Features
A1 - Being used by various outlets	A6 - Availability of an electronic voucher	A11 - Delivery service for consumers
A2 - Ideal size	A7 - Simple requirement during the purchasing process	A12 - Free delivery for certain purchase transaction value
A3 - Being sold by different company's brand outlet	A8 - Price as per voucher value	A13 - Discount for certain purchase transaction value
A4 - Being sold on an e-commerce platform	A9 - Simple redemption process	A14 - Cross promotion with various sister brands
A5 - Expiry date longer than one year	A10 - No administration fee during the purchase	A15 - No minimum purchase

TABLE II
RESPONDENTS' PROFILES.

Characteristics	Item	# of respondents
Type of Consumer	Individual	95
	Corporate	5
Occupation	Housewife	14
	Civil servant	15
	Employee	15
	Student	41
	Retiree	2
	Entrepreneur	13
Domicile	West Jakarta	7
	Central Jakarta	22
	South Jakarta	17
	East Jakarta	12
	North Jakarta	10
	Botabek	17
	Outside Jabodetabek	15
Age	< 18 years old	10
	19–25 years old	45
	26–40 years old	31
	41–50 years old	9
	50 years old	5
Purchasing Frequency	At least once/week	9
	Once every 2–3 weeks	23
	Every month	23
	Every three months	19
	Every six months	12
	Less frequent than six months	14
Amount per Transaction	< 100.000 IDR	26
	101.000–200.000 IDR	37
	201.000–500.000 IDR	26
	> 500.000 IDR	11

company. It is done using a 5-Likert scale. Last, it is for fuzzy Kano analysis. Respondents are asked to rate two sets of questions for each attribute: a functional question to address how they feel if the attribute exists and a dysfunctional question to address how they feel if the attribute does not exist.

III. RESULTS AND DISCUSSION

A. Consumer Attributes for Gift Vouchers with Affinity Diagram Workshop

Gathering possible consumers' attributes for gift vouchers is first done through literature study and participative observation, resulting in 30 attributes. From there, the researcher conducts an affinity diagram workshop with five experts from the studied company. The experts have close relationships with gift voucher consumers and experience ranging from 4 to 16 years with the company.

From the affinity diagram workshop, 15 attributes are finalized, which fall under 3 groups (product features, purchasing process, and unique selling features), as shown in Table I. The product features group handles five attributes linked to the product's physical properties and distribution options. Five criteria are chosen within the purchasing process group to describe the available possibilities to consumers during their purchasing activity. The final group introduces five more attributes that address the product's unique selling points.

B. Experiment Design for Importance Performance Analysis (IPA) and Fuzzy Kano Analysis

Once the consumer attributes are finalized, the next step is to design an experiment for quantifying situational analysis for those attributes, using a combination of IPA and fuzzy Kano. The first part of the questionnaire is related to the respondents' profile. There are

100 total respondents. Most of them are individuals, with only five representing business consumers. The most common occupation is student, with the remaining 55% working in various occupations. In terms of residence, respondents are evenly dispersed, with a smaller proportion in West Jakarta. Most of them are between 19 and 40 years old. Their purchasing frequency and average transaction value are likewise fairly distributed. Table II summarizes the entire outcome.

As the research adopts fuzzy Kano instead of traditional Kano, for functional questions, respondents can put weighted answers to "like", "must-be", and "neutral" answers as long as the sum is 100% (indicated with green cells in Table III). Similarly, they can do the same for dysfunctional questions, as indicated by orange cells in the same table. Example response in Table III suggests that when the functional characteristic is present, the respondents consider it neutral to the level of 20%, like it to the extent of 10%, and consider it must-be present to the extent of 70%. When the functional attribute is absent, the respondents dislike it to the extent of 85%, believe that they can live without it to the extent of 10%, and their conduct is neutral to the extent of 5%.

Before being used, the collected data from the

TABLE III
EXAMPLES OF FUZZY KANO RATINGS.

	Like	Must-be	Neutral	Live-with	Dislike
Functional questions	10%	70%	20%		
Dysfunctional questions			5%	10%	85%

TABLE IV
VALIDITY TEST RESULTS (R_{XY} VALUE).

Attribute	Importance	Perception	(+) Kano	(-) Kano
A1	0.506	0.563	0.751	0.393
A2	0.645	0.632	0.765	0.438
A3	0.747	0.559	0.644	0.425
A4	0.651	0.759	0.438	0.642
A5	0.614	0.765	0.624	0.567
A6	0.722	0.824	0.514	0.349
A7	0.613	0.567	0.666	0.281
A8	0.631	0.625	0.694	0.580
A9	0.536	0.654	0.762	0.421
A10	0.527	0.610	0.708	0.397
A11	0.642	0.663	0.578	0.617
A12	0.646	0.733	0.394	0.602
A13	0.589	0.611	0.780	0.557
A14	0.678	0.708	0.781	0.531
A15	0.530	0.656	0.750	0.276

questionnaire are tested for validity and reliability. The results are summarized in Table IV. All the variables for all attributes have R_{xy} more than the threshold R_{table} value of 0.17. It indicates that all variables are valid. Cronbach's alpha for the "importance" variable is 0.884, while the "perception" variable is 0.908. The values are more than 0.7. Hence, those variables are reliable.

C. Importance Performance Analysis (IPA) Result

The results in Table A1 in Appendix show the gap analysis between what customers expect (degree of importance) and their satisfaction (degree of perception towards the studied company). Table A1 in Appendix tabulates and summarizes the difference in expectation and perception scores from the 100 respondents. The researchers obtain an average gap of -0.34 by weighting the average with their expectation score of 4.21 and perception score of 3.86.

The results from the gap analysis are then visualized as an IPA grid by drawing the result into a scattered plot, as shown in Fig. 2. With IPA, it has four groups of attributes indicated by each quadrant in the scatter plot. For each attribute, the coordinate in the scatter plot is the average expectation score as the y-axis and the average perception score as the x-axis. For example, for attribute A, from 100 respondents, the average expectation score is 4.5, while the average perception score is 4.32.

Three attributes from the unique selling point dimension (A12-free delivery for a certain purchase amount,

A14-cross promotion with various sister brands, and A15-no minimum purchase) and two from purchasing process dimension (A7-simple requirement during purchasing and A10-no administration fee during purchase) are in the "concentrate here" area. Meanwhile, four attributes (A1-being used at various outlets, A5-expiry date longer than one year, A9-simple redemption process, and A13-discount for certain purchase transaction) fall under the "keep up the good work" area. Then, five attributes (A3-being sold by different company's brand outlet, A4-being sold in e-commerce platform, A6-availability in electronic voucher, A8-price as per voucher value, and A11-delivery service for customers) are in the "low priority" area. Lastly, the A2-ideal size falls in the "overkill" quadrant.

D. Fuzzy Kano Result

The functional and dysfunctional responses from each respondent for each attribute are tabulated into two sets of [1×5] matrix, as visualized in Table V for the first three respondents for the first attribute, following rules and examples in Table III. For example, the first respondent's functional matrix response is [1; 0; 0; 0], whereas his or her dysfunctional matrix response is [0; 0; 0; 0.1; 0.9]. Afterward, the transpose of the functional matrix is multiplied by the dysfunctional matrix to get a 5×5 fuzzy relational matrix for each respondent for each attribute. Then, these fuzzy matrices are mapped onto the Kano category matrix. For example, for the first respondent, the calculation becomes as follows.

$$= [1; 0; 0; 0; 0]^T \times [0; 0; 0; 0.1; 0.9] \quad (3)$$

$$= \begin{bmatrix} 0 & 0 & 0 & 0.1 & 0.9 \\ 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 \end{bmatrix} = \begin{bmatrix} Q & A & A & A & O \\ R & I & I & I & M \\ R & I & I & I & M \\ R & I & I & I & M \\ R & R & R & R & Q \end{bmatrix}$$

Hence, the Kano possibility matrix is $\left(\frac{0.1}{A} \frac{0}{M} \frac{0.9}{O} \frac{0}{I} \frac{0}{R} \frac{0}{Q}\right)$. It is calculated by summing the resulting matrix based on the Kano category matrix. Then, the possibility matrix is defuzzied using a threshold value of α. In this illustration, the Kano category for this first respondent/attribute is 'one-dimensional' (i.e., those having $\alpha \geq 0.3$). Table VI illustrates the Kano possibility and defuzzification result for the first three respondents using a threshold value of 0.3. In Table VI, the first and third responses have defuzzied using Kano category "O" since only that category has a value greater than or equal to 0.3. Then, the second response has defuzzied in Kano categories "O" and "A" using the same technique because both categories have a fuzzy value greater
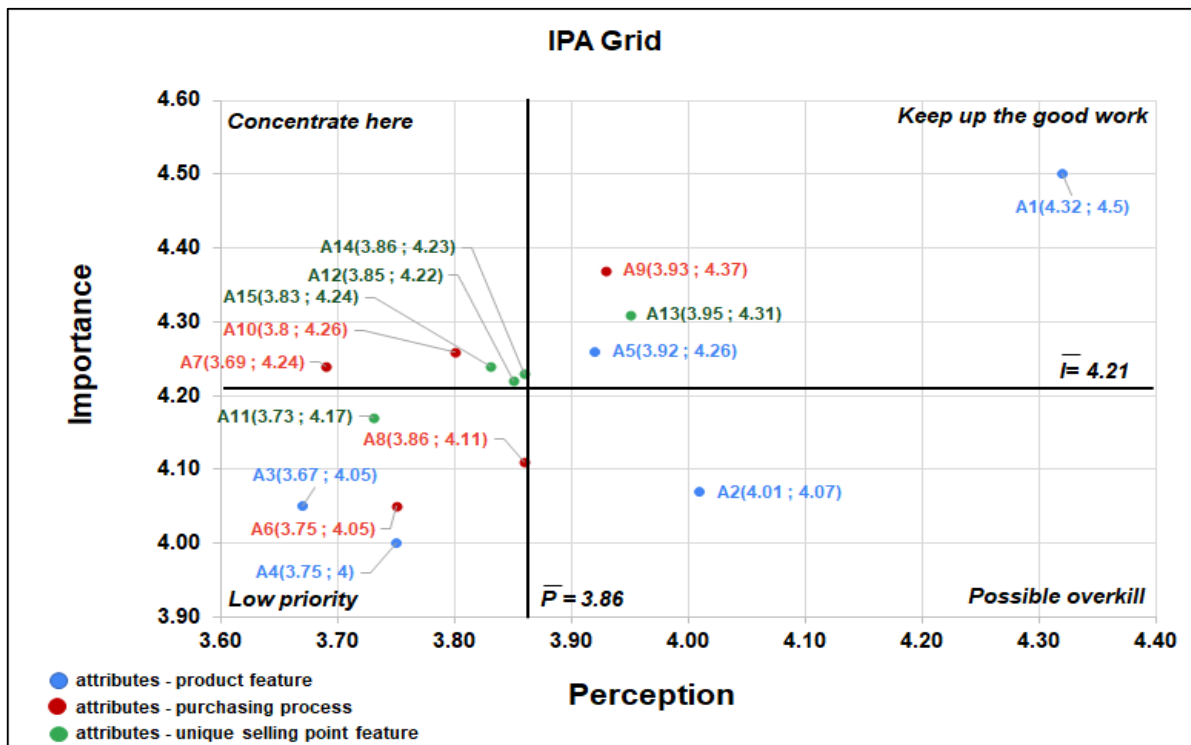
Fig. 2. Importance Performance Analysis (IPA) grid result.

TABLE V
ILLUSTRATION FOR THE FIRST ATTRIBUTE FOR THE FIRST THREE RESPONDENTS.

Response	Functional Response					Dysfunctional Response				
	Like	Must-be	Neutral	Live-with	Dislike	Like	Must-be	Neutral	Live-with	Dislike
1	1	0.0	0.0					0.0	0.1	0.9
2	1	0.0	0.0					0.3	0.0	0.7
3	1	0.0	0.0					0.0	0.1	0.9

TABLE VI
ILLUSTRATION OF FUZZY MATRIX AND KANO CATEGORY DEFUZZIFICATION FOR ATTRIBUTE 1 FOR THE FIRST THREE RESPONDENTS.

Response	Possibility Fuzzy Matrix				Defuzzied Kano Category with $\alpha \geq 0.3$			
	M	O	A	I	M	O	A	I
1	0.0	0.9	0.1	0.0		1		
2	0.0	0.7	0.3	0.0		1	1	
3	0.0	0.9	0.1	0.0		1		

Note: Must-be (M), One-dimensional (O), Attractive (A), and Indifferent (I).

than or equal to 0.3. The Kano category for each attribute is calculated by aggregating frequency from all respondents.

The selection of the threshold value of α determines the final result of the Kano category for each attribute. Several threshold values (0.1–0.4) are simulated in the research. Its effect on the overall Kano category and CS grid is displayed in Fig. 3. The lower threshold value of α gives a lower scale on the CS1 and CS2 values. At the same time, attributes in the effective improvement area also shift with different threshold values. Hence, using a threshold value of 0.3 is proposed as it gives a larger scale of CS1 and CS2, resulting in seven attributes within the effective improvement area.

E. Integration of Importance Performance Analysis (IPA) and Fuzzy Kano

Since all attributes are in the "one dimensional" category, the research uses the second integration approach by super-imposing the IPA and CS grid. Closer attention is required for attributes located in the "effective improving area" at the CS grid and the "concentrate here" or "keep up the good work" area in the IPA grid. The summary of the integration analysis
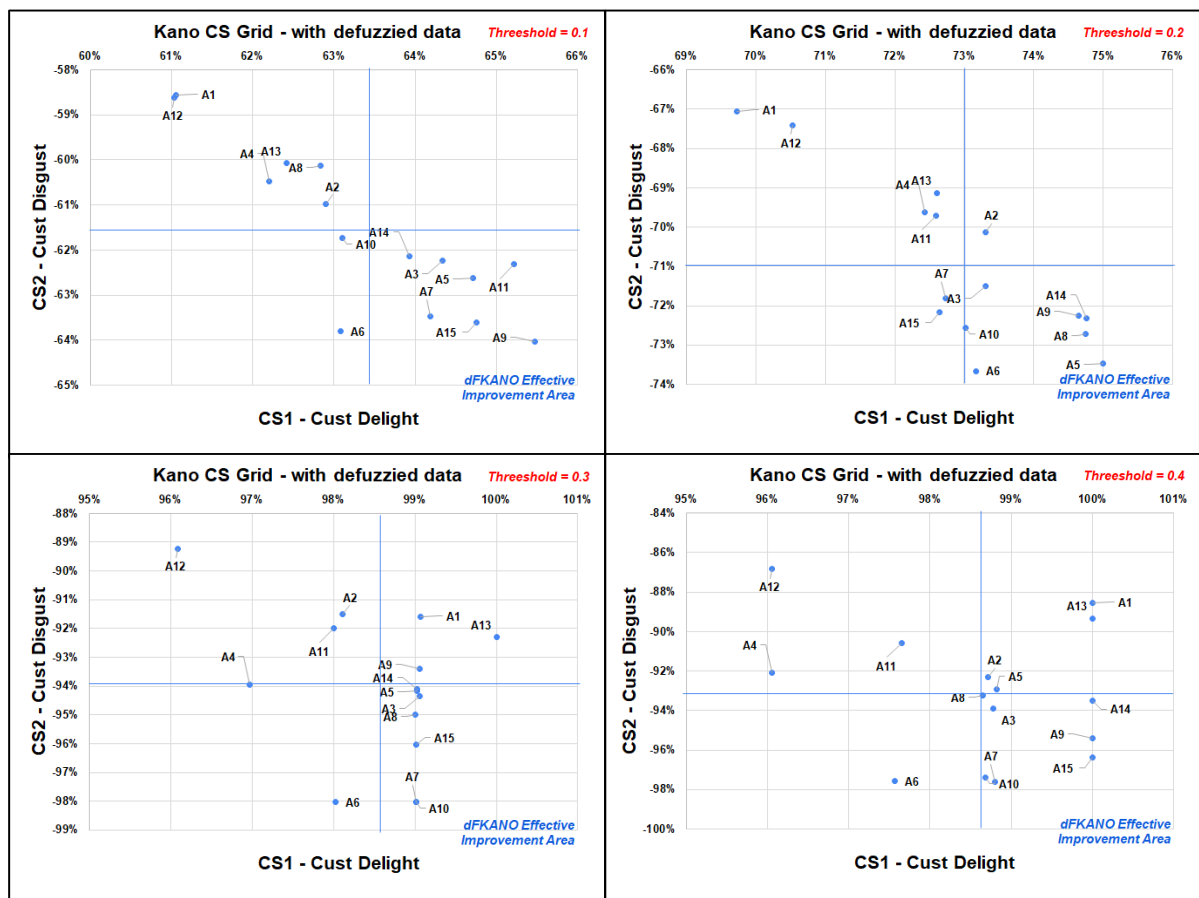
126

Fig. 3. Customer Satisfaction (CS) Grid Based on Different Threshold Values in Fuzzy Kano.

is tabulated in Table A2 in Appendix. The studied company should pay attention to A7-simple requirement during purchasing process, A10-no administration fee during purchase, A14-cross promotion with various sister brands, and A15-no minimum purchase. Customers think these four attributes are essential, but their perception of the studied company's performance is still below average. Moreover, customers also perceive these attributes as having a high potential for customer delight and disgust. Another feature they must defend is A5-expiry date greater than one year. It falls under the category "keep up the good work" so that it remains where it is in comparison to the competitor.

IV. CONCLUSION

Integrating IPA and Kano CS grid gives a pragmatic approach to deciding which customer attribute should be focused on. It is especially true when most of the attribute falls under the "one dimensional" Kano category. By super-imposing attributes under "effective improvement area" in the CS grid and "concentrate here" or "keep up the good work" in the IPA grid, the company can put more focus on strategy and resource allocation. Simulation with several threshold values also gave insight into the result. For the studied company, it is suggested to concentrate on how to enhance the A7-simple requirement during the purchasing process, A10-no administration fee during purchase, A14-cross promotion with various sister brands, and A15-no minimum purchase to become more competitive to their consumer base. Nevertheless, they should also keep alert and maintain A5-expiry date longer than one year, as their consumers perceive this attribute as their "keep up the good work" attribute.

The research has limitations as it is only a snapshot analysis of the studied company. The research can be extended into a longitudinal study, where consumer behavior patterns can be analyzed to cater to market dynamics. Moreover, unfortunately, the beauty of (fuzzy) Kano to obtain "attractive" attributes is not captured in the research. Hence, extending the research with different data collection and analysis methods can

be done to capture what exactly "attractive" attributes are that customers look for in a gift voucher.

REFERENCES

[1] Research and Markets, "Global gift cards market report 2021-2026–Robust rise of e-commerce & m-commerce to support market growth," 2022. [Online]. Available: https://tinyurl.com/2v7kftcw

[2] ——, "Indonesia gift card and incentive card market intelligence and future growth dynamics (Databook) - Q1 2023 update," 2023. [Online]. Available: https://www.researchandmarkets.com/reports/4751517/indonesia-gift-card-and-incentive-card-market

[3] N. Berg, J. Y. Kim, and J. Park, "Why do firms sell gift cards although consumers prefer cash to gift cards?" *Economic Modelling*, vol. 96, pp. 379–388, 2021.

[4] Y. Ding and Y. Zhang, "Hiding gifts behind the veil of vouchers: On the effect of gift vouchers versus direct gifts in conditional promotions," *Journal of Marketing Research*, vol. 57, no. 4, pp. 739–754, 2020.

[5] R. Becker, S. Möser, and D. Glauser, "Cash vs. vouchers vs. gifts in web surveys of a mature panel study–Main effects in a long-term incentives experiment across three panel waves," *Social Science Research*, vol. 81, pp. 221–234, 2019.

[6] E. Oey and H. Siringoringo, "Can past research generate future opportunities? – A systematic literature review for consumer behaviour in the service sector," *International Journal of Business Excellence*, vol. In Press.

[7] E. Oey, B. R. Paleva, J. Weijaya, and B. Bongara, "Generating and quantifying consumer preferences using Kansei and fuzzy analytical hierarchical process-a case study in an apparel manufacturer," *International Journal of Business Excellence*, vol. 23, no. 3, pp. 312–329, 2021.

[8] E. Oey, B. Ngudjiharto, W. Cyntia, M. Natashia, and S. Hansopaheluwakan, "Driving process improvement from customer preference with Kansei engineering, SIPA and QFD methods-A case study in an instant concrete manufacturer," *International Journal of Productivity and Quality Management*, vol. 31, no. 1, pp. 28–48, 2020.

[9] J. A. Martilla and J. C. James, "Importance-performance analysis," *Journal of Marketing*, vol. 41, no. 1, pp. 77–79, 1977.

[10] K. Ganguly and S. S. Rai, "Evaluating the key performance indicators for supply chain information system implementation using IPA model," *Benchmarking: An International Journal*, vol. 25, no. 6, pp. 1844–1863, 2018.

[11] H. Panjehfouladgaran and H. Shirouyehzad, "Classification of critical success factors for reverse logistics implementation based on importance-performance analysis," *International Journal of Productivity and Quality Management*, vol. 25, no. 2, pp. 139–150, 2018.

[12] E. Oey, T. Paramitha, and N. Novita, "Integrating Kano customer satisfaction coefficient and SIPA grid for service quality improvement," *International Journal of Productivity and Quality Management*, vol. 31, no. 2, pp. 167–188, 2020.

[13] T. H. Wu, S. J. Weng, Y. T. Lin, S. H. Kim, and D. Gotcher, "Investigating the importance and cognitive satisfaction attributes of service quality in restaurant business-A case study of TASTy Steakhouse in Taiwan," *Journal of Foodservice Business Research*, vol. 23, no. 4, pp. 263–284, 2020.

[14] T. H. Wu, S. J. Weng, R. B. Pan, S. H. Kim, D. Gotcher, and Y. T. Tsai, "Exploring service quality combining Kano model and importance-performance analysis-customer satisfaction of luxury housing service management," *International Journal of Services, Economics and Management*, vol. 11, no. 1, pp. 71–95, 2020.

[15] N. Kano, N. Seraku, F. Takahashi, and S. Tsuji, "Attractive quality and must-be quality," *Journal of the Japanese Society for Quality Control*, vol. 31, no. 4, pp. 147–156, 1984.

[16] S. Avikal, R. Singh, and Rashmi, "QFD and fuzzy Kano model based approach for classification of aesthetic attributes of SUV car profile," *Journal of Intelligent Manufacturing*, vol. 31, no. 2, pp. 271–284, 2020.

[17] A. Pandey and R. Sahu, "Mapping heritage tourism service quality using the Kano model: A case study of indian tourism," *International Journal of Services and Operations Management*, vol. 37, no. 2, pp. 264–283, 2020.

[18] M. Barkhordar and H. Shirouyehzad, "Identification of critical success factors for implementation of MIS in project-based organisations and classification using Kano model," *International Journal of Productivity and Quality Management*, vol. 27, no. 2, pp. 125–143, 2019.

[19] P. Madzík, P. Budaj, D. Mikuláš, and D. Zimon, "Application of the Kano model for a better understanding of customer requirements in higher education–A pilot study," *Administrative Sciences*, vol. 9, no. 1, pp. 1–18, 2019.

[20] P. Madzík, P. Budaj, and A. Chocholáková, "Practical experiences with the application of corporate social responsibility principles in a higher educa-

tion environment," *Sustainability*, vol. 10, no. 6, pp. 1–25, 2018.

[21] L. A. Zadeh, "Fuzzy sets," *Information and Control*, vol. 8, no. 3, pp. 338–353, 1965.

[22] P. Kinker, V. Swarnakar, A. R. Singh, and R. Jain, "Prioritizing NBA quality parameters for service quality enhancement of polytechnic education institutes–A fuzzy Kano-QFD approach," *Materials Today: Proceedings*, vol. 47, pp. 5788–5793, 2021.

[23] E. Oey, G. Librianne, E. Elvira, and D. A. Irawan, "Comparing two ways of integrating fuzzy Kano and importance performance analysis–With a case study in a beauty clinic," *International Journal of Productivity and Quality Management*, vol. 38, no. 3, pp. 285–311, 2023.

[24] Y. F. Kuo, J. Y. Chen, and W. J. Deng, "IPA–Kano model: A new tool for categorising and diagnosing service quality attributes," *Total Quality Management & Business Excellence*, vol. 23, no. 7-8, pp. 731–748, 2012.

[25] E. Oey, D. Cynthia, M. Megawati, and S. Hansopaheluwakan, "ServQual and modified Kano for process improvement–A case study of a medical device distributor," *International Journal of Business Excellence*, vol. 28, no. 3, pp. 281–299, 2022.

APPENDIX

The Appendix can be seen in the next page.

TABLE A1
SUMMARY OF GAP ANALYSIS.

Attributes			GAP ANALYSIS													Gap
			Expectation Score						Perception Score							
			VI 5	I 4	N 3	UI 2	VUI 1	Total Responses	Average Score	VI 5	I 4	N 3	UI 2	VUI 1	Total Responses	Average Score	
Product Features	A1	Being used at various outlets	62	31	2	5	0	100	4.50	44	49	2	5	0	100	4.32	-0.18
	A2	Ideal Size	19	73	4	4	0	100	4.07	19	67	10	4	0	100	4.01	-0.06
	A3	Being sold by different company's brand outlet	31	46	20	3	0	100	4.05	12	50	31	7	0	100	3.67	-0.38
	A4	Being sold on an e-commerce platform	23	60	11	6	0	100	4.00	14	55	23	8	0	100	3.75	-0.25
	A5	Expiry date longer than one year	43	42	13	2	0	100	4.26	29	41	23	7	0	100	3.92	-0.34
Purchasing Process	A6	Availability of an electronic voucher	25	58	14	3	0	100	4.05	14	56	21	9	0	100	3.75	-0.30
	A7	Simple requirement during the purchasing process	42	42	14	2	0	100	4.24	13	51	28	8	0	100	3.69	-0.55
	A8	Price as per voucher value	25	63	10	2	0	100	4.11	13	65	17	5	0	100	3.86	-0.25
	A9	Simple redemption process	48	43	7	2	0	100	4.37	20	58	17	5	0	100	3.93	-0.44
	A10	No administration fee during the purchase	34	59	6	1	0	100	4.26	10	66	18	6	0	100	3.80	-0.46
Unique Selling Features	A11	Delivery service for customers	35	49	14	2	0	100	4.17	8	63	23	6	0	100	3.73	-0.44
	A12	Free delivery for certain purchase transaction value	31	60	9	0	0	100	4.22	12	65	19	4	0	100	3.85	-0.37
	A13	Discount for certain purchase transaction value	40	52	7	1	0	100	4.31	20	60	15	5	0	100	3.95	-0.36
	A14	Cross promotion with various sister brands	34	57	7	2	0	100	4.23	12	65	20	3	0	100	3.86	-0.37
	A15	No minimum purchase	33	58	9	0	0	100	4.24	13	59	26	2	0	100	3.83	-0.41
		TOTAL							4.21							3.86	-0.34

Note: VI: Very Important, I: Important, N: Neutral, UI: Unimportant, and VUI: Very Unimportant

TABLE A2
FUZZY KANO RESULTS AND ITS INTEGRATION WITH IMPORTANCE PERFORMANCE ANALYSIS (IPA).

Attributes	Fuzzy Kano					Defuzzied Kano (Threshold 0.3)					CS Grid Analysis (Based on Defuzzied Kano)			
	M	O	A	I	Total	M	O	A	I	Total	CS1	CS2	Effective Improvement Area?	IPA Category
A1	19	46	24	10	100	1	97	9	0	107	99.1%	-91.6%		Keep up the good work
A2	18	51	22	9	100	1	96	8	1	106	98.1%	-91.5%		Possible overkill
A3	18	54	20	8	100	1	99	6	0	106	99.1%	-94.3%	Yes	Low priority
A4	18	50	22	10	100	1	92	4	2	99	97.0%	-93.9%		Low priority
A5	17	55	20	7	100	1	96	6	0	103	99.0%	-94.2%	Yes	Keep up the good work
A6	19	56	18	8	100	2	97	2	0	101	98.0%	-98.0%		Low priority
A7	17	56	18	8	100	0	99	1	1	101	99.0%	-98.0%	Yes	Concentrate here
A8	17	53	21	9	100	0	95	4	1	100	99.0%	-95.0%	Yes	Low priority
A9	17	57	19	7	100	0	99	6	1	106	99.1%	-93.4%		Keep up the good work
A10	18	55	19	8	100	1	98	2	0	101	99.0%	-98.0%	Yes	Concentrate here
A11	17	50	25	7	100	2	90	8	0	100	98.0%	-92.0%		Low priority
A12	18	47	24	10	100	1	90	8	3	102	96.1%	-89.2%		Concentrate here
A13	18	49	24	9	100	0	96	8	0	104	100.0%	-92.3%		Keep up the good work
A14	17	55	20	8	100	0	96	5	1	102	99.0%	-94.1%	Yes	Concentrate here
A15	16	58	18	8	100	0	97	3	1	101	99.0%	-96.0%	Yes	Concentrate here
											98.6%	-94.1%		

Note: Must-be (M), One-dimensional (O), Attractive (A), Indifferent (I), Importance Performance Analysis (IPA), Customer Satisfaction (CS), Customer Delight (CS1), and Customer Disgust (CS2).