Measurement of e-service quality from user perceptions using the IPA-Kano integration model

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Abstract. Users have a very important role in the service industry. If the users are satisfied with the service, then they will reuse it in the future. Conversely, if they feel dissatisfied, users will look for similar services from competitors. In this research, the case study is XYZ, one of online marketplaces that have begun to evolve in Indonesia. The research purpose was to measure e-service quality from the perception of users by using the Kano-IPA integration model. The research methodology used is by distributing questionnaires. Service attributes are based on the dimensions of E-Service quality; consisting Efficiency, Fulfilment, Reliability, Privacy, Responsiveness, Compensation and Contact. The number of service attributes designed is 28. Respondents are users of the XYZ in Cilegon. Importance Performance Analysis (IPA) is one of satisfaction analysis methods that is commonly used to map the level of satisfaction with the level of importance of service attributes. On the other hand, the Kano model classifies service attributes under the category of Must-Be, Performance, and Attractive. The results shown that the Compensation dimension still needed serious attention from the management. The highest level of satisfaction felt by service users was in the Privacy dimension.

1. Introduction
Based on APJII, 2017, an association of internet organizer in Indonesia, shows that growth of Indonesian internet user is escalate over the years. The increase in internet users until 2017 was recorded at 54.68% and as much as 32.19% internet users aim to shop online. The shifting of consumer consumptive behaviour to online shopping was triggered by the presence of an online marketplace provider of buying and selling services with the Customer to Customer (C2C) model.

As one of the industries engaged in services, customer satisfaction is something that must be considered by marketplace organizers in Indonesia. If the users are satisfied with the service, then they will reuse it in the future. Conversely, if they feel dissatisfied, users will look for similar services from competitors. Therefore, measurement of service user satisfaction is needed to determine the extent to which users perceive the services provided by service providers. In this research, the case study is XYZ, one of online marketplaces that have begun to evolve in Indonesia.

Studies on measuring customer satisfaction have been carried out by many previous researchers. This Various kind of customer satisfaction measurement methods used by researchers include the Customer Satisfaction Index (CSI), Service Quality (Servqual), and Importance Performance Analysis (IPA) [1]. Servqual is widely used as a method of measuring customer satisfaction in the service industry.
The purpose of this study is to measure e-service quality from the perception of users by using the Kano-IPA integration model. In this study, the method of e-service quality (e-servqual) will be used because the object of research is the organizer of the internet-based marketplace. In e-servqual there are 7 dimensions, they are Efficiency, Fulfillment, Reliability, Privacy, Responsiveness, Compensation and Contact [2]. Whilst to measure customer satisfaction will use the integration of IPA with the Kano model. As done by [3] identifying key success factors using integrated IPA-Kano. Likewise, [4] which integrates IPA-Kano to analyze service quality elements of the mobile ride-hailing app.

The measurement of service quality in this study is important to evaluate XYZ service performance because of many choices to be chosen by the users in the same business. This study would be helpful for companies engaged in services industries, especially companies in electronic services. This study is also expected to add insight to researchers

2. Method

The research instrument was a questionnaire. It was designed by the seven dimensions of e-servqual as the criteria since the case study is a marketplace. The dimensions are Efficiency, Fulfillment, Reliability, Privacy, Responsiveness, Compensation, and Contact. From these dimensions it is then broken down into service attributes according to the characteristics of XYZ. From the observation, there are 5 service attributes on Efficiency, 5 service attributes on Fulfillment, 7 service attributes on Reliability, 3 service attributes on Privacy, 4 service attributes on Responsiveness, 2 service attributes on Compensation, and 2 service attributes on Contact. The total of all service attributes is 28.

The research scope is limited to XYZ service users around Cilegon city. Criteria of the user is who have experienced shopping experience at least 3 times. Respondents were asked to rate XYZ services based on their level of satisfaction and level of importance of each service attributes. In addition, respondents were also asked to rate their preferences if the service attributes were functioning or not functioning.

The results of respondents' assessment of the level of satisfaction and level of importance are used as determinants of the level of concordance of each service attribute. The satisfaction level and importance level of each service attribute are then mapped in the Cartesian diagram with the X axis is the satisfaction level and the Y axis is the importance level. The diagram then divided into 4 quadrants, the first quadrant is the Keep Up the Good Works, the second quadrant is Concentrate Here, the third quadrant is Low Priority, and the fourth quadrant is Possible Overkill.

Service attributes that belong in quadrant I are service attributes perceived by the user that have met the expectations of the service, or in other words, the user is satisfied with the service provided. Service attributes that belong in quadrant II are service attributes perceived by the user that meet the expectations for the service, or in other words, the user is dissatisfied with the service provided. Service attributes that belong in quadrant III are service attributes that are felt to be not too important for the user but the service provided is felt to be unsatisfied. Service attributes that belong in quadrant IV are service attributes perceived as not too important for the user, but the service provided is felt to be satisfied.

The results of the respondent's assessment of preference if the service attribute is functioning or not functioning are then translated into the Cartesian diagram with the X axis is the dysfunctional service attributes and Y axis is the functional service attributes. In the diagram then divided into 4 categories, the first category is must-being, the second category is performance, the third category is attractive, and the fourth category is indifference.

Service attributes that fall into the category of must-be mean according to the user, these attributes are service attributes that must exist or become basic service attributes. When done well, the user feels just neutral, but when done poorly, the user feels very dissatisfied. The service attributes included in the performance category mean that according to the user the attributes are expected service attributes, if executed with good users are satisfied, but if not, the users are dissatisfied. Service attributes that are included in the attractive category means that the user feels very satisfied if this attribute is executed.
properly, and feels neutral if this attribute does not exist. Service attributes that fall into the indifferent category mean that the user feels neutral if the service attribute exists or does not exist.

3. Result and discussion

Table 1 is a list of service attributes contained in XYZ that have been divided based on the e-servqual dimension. Based on [5] efficiency is the ability of customers to access the website, search for the desired product and information related to the product, and leave the site concerned with minimal effort. Fulfillment includes accuracy of service appointments, availability of product stock, and product delivery in accordance with the promised time. Reliability regarding to the technical functionality of the site concerned, in particular the extent to which the site is available and functioning properly. Privacy guarantees that shopping behavior data will not be given to any other party and that the customer's personal information is secured. Responsiveness is the ability to provide the right information to customers when problems arise, have a mechanism to handle product returns, and provide an online guarantee. Compensation includes refunds, shipping fees, and product handling fees. Contact reflects the customer's need to be able to talk to customer service staff online or by telephone. The dimensions of e-servqual used in [6] research have only 3 dimensions, this is caused by different research objects where [6] examines the service of an internet banking.

The answers from the respondents were then tested for validity and reliability, the results were valid and reliable. Validity testing uses Pearson Product Moment correlation [7], where if R count > R table then the data is declared valid. The number of respondents is 202 with a significance level of 5%, so the R value of the table is 0.1381. Whereas to test reliability using Cronbach's Alpha (α), where data is declared reliable if α > 0.6 [8]. The calculation results show the value of α is 0.952, that is to say data is reliable.

| Dimension  | Number | Service Attribute                  | Dimension  | Number | Service Attribute                  |
|-----------|--------|------------------------------------|-----------|--------|------------------------------------|
| Efficiency| 1      | The pages load quickly             | Privacy   | 18     | Protected personal data            |
|           | 2      | User friendly                      |           | 19     | Protected transaction data         |
|           | 3      | Search engine available            |           | 20     | Protected credit card data         |
|           | 4      | Easy shopping flow                 | Responsiveness | 21   | Real time notification             |
|           | 5      | Vary payment option                |           | 22     | Quick response                     |
| Fulfillment| 6    | On time delivery                   |           | 23     | 24 hours response                  |
|           | 7      | Money back guarantee               |           | 24     | Fast order confirmation            |
|           | 8      | Availability guaranteed            | Compensation | 25   | Money refund                       |
|           | 9      | Free shipping (T&C)                |           | 26     | Return of goods                    |
|           | 10     | Goods match with description       | Contact    | 27     | 24 hours call centre               |
| Reliability| 11   | Rating for seller                  |           | 28     | Customer service available         |
|           | 12     | Flash sale                         |           |        |                                    |
|           | 13     | Official store                     |           |        |                                    |
|           | 14     | Vary of products                   |           |        |                                    |
|           | 15     | Cheap price                        |           |        |                                    |
|           | 16     | Promos and discount                |           |        |                                    |
|           | 17     | Accurate search engine             |           |        |                                    |

Table 2 is the percentage of the level of conformity between satisfaction level compared to importance level. As can be seen, the percentage level of concordance does not reach 100%, that is to say there is still a gap between the level of satisfaction and the level of importance perceived by the user. In the study of [9] there were level of concordance is also below 100%, it was showing the gap between expectation and desire of customer. The score of the level of satisfaction and level of importance is then mapped into the IPA diagram as can be seen in figure 1.

In figure 1 it can be seen that the service attributes are spread into 4 quadrants. If XYZ wants to make improvements to the service, it can immediately focus on quadrant II, where the user feels that the service attributes are very important but the services obtained are not satisfied. For example, users
still find it difficult to get a money refund right, because there are many stages of confirmation for both the buyer and the seller so that the rights can be obtained. The service attributes that are considered satisfying enough for the user are in quadrant I, this is an advantage possessed by XYZ. For example, the user feels satisfied with the search engine feature given of XYZ. From the user’s point of view this attribute is very important because when a user wants to find a product that is needed, the product can be easily and quickly found by search engines. What is felt by the user, it turns out the user is satisfied with the attributes of this service. In the study of [9] the attributes also spread into 4 quadrants. From total of 15 attributes, there are 5 attributes step into quadrant II.

### Table 2. Level of concordance.

| Number | Level of Satisfaction | Level of Importance | Level of Concordance (%) | Number | Level of Satisfaction | Level of Importance | Level of Concordance (%) |
|--------|-----------------------|---------------------|--------------------------|--------|-----------------------|---------------------|--------------------------|
| 1      | 790                   | 892                 | 88.565                   | 15     | 826                   | 899                 | 91.88                    |
| 2      | 812                   | 871                 | 93.226                   | 16     | 836                   | 911                 | 91.767                   |
| 3      | 844                   | 920                 | 91.739                   | 17     | 792                   | 917                 | 86.369                   |
| 4      | 861                   | 899                 | 95.773                   | 18     | 856                   | 961                 | 89.074                   |
| 5      | 858                   | 891                 | 96.296                   | 19     | 856                   | 959                 | 89.26                    |
| 6      | 776                   | 916                 | 84.716                   | 20     | 852                   | 970                 | 87.835                   |
| 7      | 771                   | 908                 | 84.912                   | 21     | 820                   | 891                 | 92.031                   |
| 8      | 754                   | 875                 | 86.171                   | 22     | 745                   | 896                 | 83.147                   |
| 9      | 780                   | 826                 | 94.431                   | 23     | 739                   | 883                 | 83.692                   |
| 10     | 808                   | 955                 | 84.607                   | 24     | 804                   | 905                 | 88.84                    |
| 11     | 816                   | 846                 | 96.454                   | 25     | 756                   | 944                 | 80.085                   |
| 12     | 760                   | 832                 | 91.346                   | 26     | 739                   | 951                 | 77.708                   |
| 13     | 806                   | 836                 | 96.411                   | 27     | 736                   | 875                 | 84.114                   |
| 14     | 811                   | 889                 | 91.226                   | 28     | 739                   | 904                 | 81.748                   |

**Figure 1.** Importance performance analysis of XYZ’s service attributes.
**Figure 2.** Kano categories of XYZ’s service attributes.

| Service attribute | Kano's category | Importance |
|-------------------|-----------------|------------|
| 26                | M               | 4.708      |
| 25                | M               | 4.673      |
| 23                | M               | 4.495      |
| 28                | M               | 4.475      |
| 17                | I               | 4.54       |
| 6                 | I               | 4.535      |

**Concentrate Here**

- 26
- 25
- 23
- 28
- 17
- 6

**Keep Up the Good Work**

- 20
- 18
- 19
- 10
- 3
- 24

**Low Priority**

- 9
- 22
- 1
- 23
- 8
- 27

**Possible Overkill**

- 16
- 14
- 2
- 11
- 4
- 21
- 15

**Figure 3.** IPA-Kano integration.

Figure 2 is a result of what the user feels if the service attribute is functioning or not functioning. The results of data processing, obtained service attribute categories as in figure 2 above. Examples of attributes included in the performance category are attribute 10, i.e. goods match with description. This shows that users will feel very satisfied when the items received are in accordance with the variants ordered, it means that the service performance of this attribute is perceived by the user to be running well. But if at any time the service performance of this attribute does not go well as if there is an error in sending goods because it is exchanged with other buyers or wrong variants ordered, not only sellers lose their customers but can also reduce the image of XYZ as an organizer.

The example of service attributes in the attractive category is attribute 2, user friendly, this can be interpreted that XYZ users are satisfied with the performance of this service attribute. The XYZ site
has an application that makes it easier for users to use the features that have been provided and also has an attractive appearance so that users feel comfortable and happy when using the XYZ site. In addition, with an attractive appearance, it will grow the interest of users to shop continuously.

Figure 3 shows the integration result of IPA and Kano. The results of this integration confirm the priority in the IPA diagram based on the results of Kano. Based on [3] quadrant I and IV are considered advantages, then, the priority order on Kano based is Attractive, Performance, Must-be. While quadrant II and III are considered as weaknesses, so the priority order on Kano based is Must-be, Performance, Attractive. Service attributes in Indifferent are considered unnecessary prioritized. If there are the same categories in a quadrant, then, attributes are sorted by their importance.

Based on figure 3, priority improvements can be made with the order of attribute 26 (compensation), attribute 25 (compensation), attribute 7 (fulfillment), attribute 28 (contact), attribute 17 (reliability), and attribute 6 (fulfillment). If we look based on the e-servqual dimension, it seems that the service that must be improved is on the compensation dimension, because this dimension consists of 2 service attributes and the two attributes are included in the priority of repairs.

While the order of service attributes included in the keep up the good work quadrant is attribute 16 (reliability), attribute 20 (privacy), attribute 18 (privacy), attribute 19 (privacy), attribute 10 (fulfillment), attribute 3 (efficiency), and attribute 24 (responsiveness). If we look based on e-servqual dimensions, we can see that the service that must be maintained is on the privacy dimension, because in this dimension there are 3 service attributes and the three attributes are included in this quadrant.

4. Conclusion
The results showed that the XYZ service translated into 28 service attributes was said to be quite good. Even if it is seen that there are still service attributes that enter quadrant II on the science diagram, the overall service perceived by the user can be categorized as good. The Compensation dimension still needed serious attention from the management. The highest level of satisfaction felt by service users was in the Privacy dimension. This study uses respondents in the Cilegon city area, the result might different if the respondent area is expanded.

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