Service Quality Assessment of E-Wallet

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Abstract
In a good term, the service sector in this digital era has been altered and influenced by the use of the Internet. One of the changes is in the payment option; people nowadays have embraced in a cashless transaction. In such, e-wallet (an application in the smart/mobile phone setting) plays its role. As time goes by, the competition in this industry has become fierce. To be the first choice for the customers, the provision of an excellent service is essential. In this sense, this research aims to analyse the service quality of e-wallet according to the competitive zone of tolerance. It was performed by benchmarking against its competitors and prioritizing the service attributes to be enhanced. A case study has been conducted to assess the service quality of an Indonesian-based e-wallet application. Result shows that the object of the research needs to improve its performance compared to its competitors. Recommendations as a part of continuous improvement also provided. This research is expected to provide a company with valued insights into the attributes which reflect perceptions of the customers.

Keywords
Service Quality, CZSQ, CZIPA, E-Wallet

1. Introduction
In this digital age, the Internet has grown fast to serve millions of users in all parts of the world for a huge number of purposes. With more than 40% of the world population or 4 billion users, the Internet has been developed as an extremely powerful means that has changed the way people do business. For firms in particular, with the support of the Internet, they have adopted the new information and communication technology to support their activities. They have tried to advance some competitive advantages interacting with the customers by means electronic commerce (e-commerce). Most successful firms have recognized that one of the critical success aspects in engaging e-commerce is not the website appearance and the low price, but also the quality of electronic service (e-service) (Zeithaml 2002).

Indonesia is one of the largest Internet and mobile users in the world. Around 40% of individuals in Indonesia had access to the internet. The popularity of the Internet has increased the number of internet users from 2 million users in 2000 to more than 100 million users in 2018. Currently, Indonesians are showing every sign of embracement toward cashless transaction solutions. Indeed, there is a wide range of services across the city offering a payment alternative to validate the embracement. Without the aid of the Internet, this activity is practically impossible. One of the solutions for this cashless activity is the presence of e-wallet. Due to numerous uses of smart (mobile) phones, e-wallet has adapted to be e-wallet application.

There are around 38 applications of e-wallet registered in Bank Indonesia. The total value of this new way of electronic transactions worth US$ 1.5 billion in 2018, and it is estimated to reach US$ 25 billion by 2023. The Indonesian fintech industry led by their own local names. According to monthly active users from Google Play Store and iOS, the top five e-wallet applications are GoPay, OVO, DANA, LinkAja, and Jenius. Among the most common services for such applications are offline transactions, e-commerce payments, and public transportation. The advantages of using this e-wallet application as an alternative in cashless payment method for many users are instant cashback offers and additional points. Viewing from the merchant's side, it is claimed that cashback promos, which range between 20 to 40 percent, somehow boosted their sales.

In the midst of the intense competition for e-wallet applications, firms experienced several problems related to the payment system. According to mediakonsumen.com, from January to October 2019, there were 94 customer complaints, including 77 complaints regarding the security of personal data and balances, 14 complaints regarding the

reliability of customer service, and 3 complaints against the application system. Also, the information collected through official Instagram of an e-wallet application, a balance that does not enter the application but has been cut from the bank account is one of the most criticisms complained about. Consequently, the e-payment system (EPS)—as well as security—are problems to be handled by the service providers (Herzberg 2003).

The firm has to enhance the quality of the service to prevent the increasing number of complaints to survive from the competition with others. Good service must be the mission of the firm to win in the competition. The firm has to continuously enhance the service quality since it is believed as a vital aspect for the successes of the service providers (it has a close connection to customer satisfaction (Hai-siu et al. 2007; Parasuraman and Zeithaml 1985). Furthermore, an excellent service leads to customer retention as well as repeat customer purchase behaviour (Cronin and Taylor 1992). It might escalate the market share and produces high revenues as well (Luo and Homburg 2007).

Researchers around the world have widely studied in terms of how to perform the assessment of the service quality; two of the most well-known scales are the classical SERVQUAL (Parasuraman et al. 1993) and SERVPERF (Cronin and Taylor 1992) that can be applied in various service areas. However, those are considered as a decline in evaluating the priority of improving the attributes of service quality. The rationale behind the need for prioritizing is since every firm is constrained by its limited resources so that it must be decided how the limited resources are best deployed to attain customer satisfaction. The classic importance-performance analysis (IPA) model (Martilla and James 1977) is the conventional method to prioritize attributes in order to improve the quality of the service. It is considered as a simple and effective method to look for attributes which perform good and those which need to be improved. It is widely used and applied, (see (Rasyida et al. 2016; Ulkhaq et al. 2017; Pramono et al. 2017; Ulkhaq et al. 2019; Ulkhaq et al. 2019) for the examples of its applications). Although IPA is popular due to its simplicity, easy to use and be interpreted, the applicability has certain limitations (see the next section for a brief explanation). In this sense, the customer zone of tolerance-based service quality (CZSQ) and CZSQ-based IPA (CZIPA) (Chen 2014) is considered as a remedy for the classical IPA.

Despite the superiority of CZSQ and CZIPA, their application to evaluate the service quality of an e-wallet application (or website) remains limited ((as the best of our knowledge, they have been applied to evaluate service quality of hotel (Chen 2014), low-cost carriers (Ulkhaq et al. 2016), and hospital (Ulkhaq et al. 2018). Therefore, this research tried to widen the application of CZSQ and CZIPA to assess the service quality of an e-wallet application. To exhibit the applicability of the methods, a case study has been conducted to measure the service quality of an Indonesian-based e-wallet application.

2. Research Design

To measure and analyse the service quality of e-wallets, four dimensions adapted and modified from (Kim et al. 2010) were employed, namely, technical protections, transaction procedures, security statements, and perceived trust. These four dimensions which consist of 21 attributes are described in Subsection 2.1, while the methods used, i.e., CZSQ and CZIPA, are explained in Subsection 2.2 and 2.3, respectively.

2.1. Dimensions and Attributes

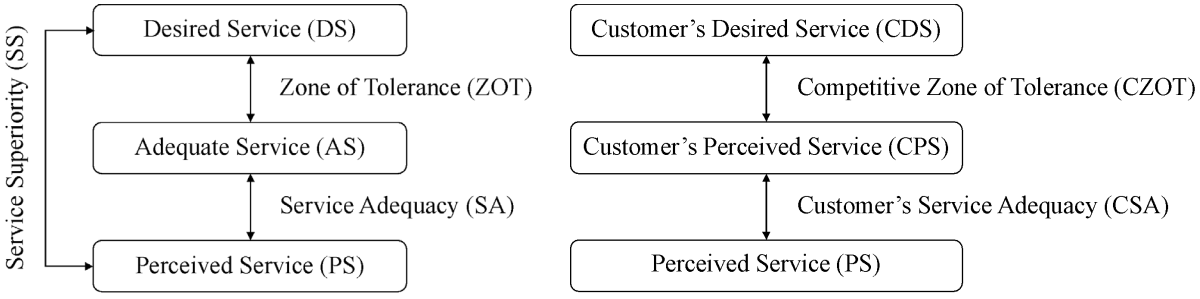
The first dimension, i.e., technical protections, generally regards as the foundation of electronic payment security (EPS). Some specific technical mechanisms are operated to guarantee payment security throughout the transaction process on the Internet (Kousaridas et al. 2008). This dimension was measured by three factors, i.e., privacy, integrity, and confidentiality (Friedman 2002; Tsiakis and Sthephanides 2005; Hwang et al. 2007). A privacy-protection mechanism has the ability to assure customers that their personal information is guaranteed to not be revealed to other parties (Wright 2002; Peha and Khamitov 2004). They also would like to certify that the information provided to the service providers, i.e., the payment process, cannot be utilized by others (Chou et al. 2004). Integrity as the second factor measures the payment information security during and after the payment process (Furnell and Karweni 1999), meaning that the service providers ensure that other parties cannot alter the payment information (Kousaridas et al. 2008; Tsiakis and Sthephanides 2005; Hwang et al. 2007). Costumers obviously expect that the payment information as well as the amount of payment remain unchanged. Next, confidentiality is defined as the prevention of unauthorized parties from capturing, interpreting, or understanding the data. It plays an essential function in an acquisition of customers' confidence when they are doing a transaction. In sum, six attributes were generated according to the previous explanation; they are: (i) personal information has never been stolen (KT1), (ii) the personal information has never been released to other third parties for any purpose (KT2), (iii) displayed transaction data or the payment amount is always accurate (KT3), (iv) transaction data conveyed over the Internet is protected (KT4), (v) payment services

are available at any time as always (KT5), and (vi) temporary or unforeseen errors never occurs throughout the transaction (KT6).

The second dimension has an objective to ease customers' use of EPS and to remove their worries about the security of EPS. This dimension was measured by three factors, i.e., authentication, modification, and confirmation. The first is a means by which the identity of customers is verified prior to transaction in the EPS (Tsiakis and Sthephanides 2005; Hwang et al. 2007). Although this offers an initial procedure for inhibiting illegal interferences, it is subject to a number of risks which might rise from the open nature of the Internet. It is directly connected to payment security, and hence affects customers' perceptions towards the service providers (Kousaridas et al. 2008; Tsiakis and Sthephanides 2005) . Confirmation as the last factor is a means by which the customers can be guaranteed that their payments have been received by the service providers. In this procedure, service providers typically send a message (e.g., phone message of e-mail) to the customers. The provision of acknowledgment information of the payment would affect customers' perceptions of security and trust in EPS use. Six attributes were generated for this dimension, namely, (i) Username and password are needed when customers log-in (PT1), (ii) various means are provided by EPS to do authentication (PT2), (iii) the application offers an opportunity to modify any information prior to finalizing the final stage of the payment process (PT3), (iv) the site offers a step to verify a payment prior to the finalization of the actual payment (PT4), (v) the site shows the payment information summary altogether with the amount of the final payment (PT5), and (vi) a confirmation is sent to the customers, e.g., by a mobile phone message, e-mail, etc. to guarantee the customers that the payment has been received (PT6).

The third dimension, i.e., security statements, is considered as a vital factor influencing customers' belief in online activities (Mukherjee and Nath 2003). By notifying and reassuring customers about the payment options' security, it is likely to affect their perceptions about the security as well as trust in EPS (Lim 2008). If normal customers still unaware about the level of security which is embedded to their transactions, they might be reluctant to do payment (Lim 2008; Lee and Turban 2001). Consequently, customers' decisions to use any EPS will be affected by the quality of security statements. In sum, six attributes were generated, i.e., (i) the site offers comprehensive explanations such as how to review, cancel, modify, or record a payment (PK1), (ii), the site supplies security statements on security-policy, contact details under any circumstance, technical descriptions and functionalities of the EPS (PK2), (iii) customers do not require to make any additional effort to locate security-related statements (PK3), (iv) customers' concerns on security matters can be found from frequently asked questions or from a help section easily (PK4), (v) security-related statements are outlined in a coherent way and largely free from technical words (PK5), and (vi) security-related statements are outlined in a wording that appeals customers' attention (PK6).

The last dimension, i.e., perceived trust, refers to customers' trust that the transactions will be administered according to customers' expectations (Tsiakis and Sthephanides 2005; Mallat 2007). Customers are able to make a thoughtful selection according to the knowledge of possible rewards in trusting and not trusting. Trust enables high payoff while distrust evades potential damages (Kousaridas et al. 2008). Their attitudes toward EPS are linked to customers' perceptions of the security of the systems. Strictly speaking, customers' point of view about security- enforcement principles amplify their trusts in security and thus contribute to their perceptions of trust for electronic transactions. Without trust, it would be immensely challenging for service providers to gain widespread and boundless usage. There are three attributes generated for this dimension, i.e., (i) the service provider considerably can be trusted (K1), (ii) the service provider cares about the customers (K2), and (iii) the service provider is not an opportunistic party (K3).



a. Zone of tolerance concept b. Competitive zone of tolerance concept

Figure 1. The concept of zone of tolerance and competitive zone of tolerance.

2.2. Customer Zone of Tolerance-based Service Quality (CZSQ)

CZSQ was inspired by the zone of tolerance (ZOT) concept (Parasuraman et al. 1991). In a sense, ZOT refers to an area between two zones, i.e., the desired service (DS) or ideal service performance and the adequate service (AS). DS is the zone that the customers believe that an excellent service provider should offer for the best performance; while AS is the zone that the customers could barely accept the service. ZOT evaluates how customers perceived the service (PS) differs from DS. This disparity refers to the service superiority (SS). The service adequacy (SA) refers to the difference between PS and AS. If PS falls below AS, then the customers become frustrated and dissatisfied; instead, when PS exceeds DS, s/he feels satisfied (see Figure 1a).

The concept of ZOT then was refined as CZOT (Chen 2014) to manage the drawback of ZOT to evaluate the priority of attributes that have to be improved (Hu 2010). The customer's perceived service of competitors (CPS) is analogously regarded as AS and customer's desired service performance (CDS) as DS, with a similar explanation. Therefore, CZOT can be seen as the difference between CDS and CPS. While customer service adequacy (CSA) refers to the gap between PS and CPS (see Figure 1b). Based on this concept, CZSQ was introduced to assess the service quality of the firm relative to its competitors. CZSQ can be calculated as follows:

$$CZSQ = (PS - CPS)/(CDS - CPS) = CSA/CZOT \quad (1)$$

The different values of CZSQ have different consequence for service quality as follows: (i) $CZSQ < 0$; (ii) $0 \leq CZSQ \leq 1$; and (iii) $CZSQ > 1$. The first is defined when PS is lower than CPS, meaning that the customers might feel dissatisfied with the firm's performance. In this case, some improvements should be made so that the possibility for the customer to create negative word-of-mouth could be diminished. The second category is defined when PS is approximately equal to, or higher than, CPS. It means that the customer is satisfied but the performance of the service provider has not yet reached the highest expectation. The last is defined when PS exceeds CDS. In this case, the customer feels delighted and satisfied and the service provider is expected to enjoy high customer loyalty.

2.3. CZSQ-based Importance-Performance Analysis (CZIPA)

Prioritizing attributes to enhance the quality of the service has to be performed by service providers because they are constrained by limited resources they have. IPA analysis (Martilla and James 1977) is widely applied due to its simplicity and practical use. However, IPA suffers for several conditions (Matzler et al. 2004). First, since no standard for setting the range of vertical and horizontal axes, measurement scale, as well as the location of the horizontal and vertical lines, IPA may lead to the measurement bias (Oh 2001; Taplin 2012). It is also criticized that it only considers the service providers' performance but ignores the relative performance of their competitors (Keyt et al. 1994). IPA also is not taking into account for differences between the characteristics of service attributes. CZIPA is considered as a *remedy* of the classical IPA which takes into account some limitations of IPA.

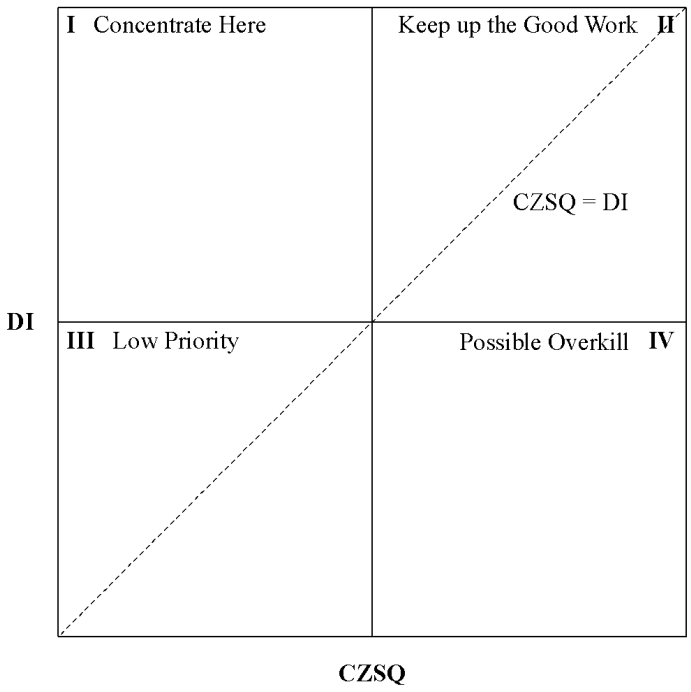


Figure 2. Typical CZIPA diagram.

CZIPA diagram is a two-dimensional state space, in which the vertical axis represents the difference in importance (DI), and CZSQ is its horizontal axis. The difference in gap d is defined as d = CZSQ – DI, where DI refers to the difference in importance or $I_1 - I_2$ (subscript 1 is the focal firm while subscript 2 is its competitors). When $d \geq 0$, it means that the particular service attribute equals or surpasses the competitors' performance, hence, the improvement has low priority. Contrarily, when $d < 0$, the improvement has high priority to be made. The diagram is categorized as four quadrants, see Figure 2, i.e., (I) concentrate here, (II) keep up the good work, (III) low priority, and (IV) possible overkill. The first quadrant has the attributes which are the priority of the management to be improved because of having high importance but having low performance. The second quadrant identifies that importance and performance are highly rated and should be preserved well. Low rated attributes in importance and performance were located in the third quadrant. The last quadrant is where the unnecessary attributes located, because of having low importance but having high performance. A diagonal line which represents the ideal line passes through the original where CZSQ = DI; hence, service attributes that are located in the left of the line are worse than that of its competitors.

3. Case Study Result

A case study to show the applicability of the methods has been piloted to evaluate the service quality of an Indonesian-based e-wallet application (called "focal firm"). The assessment has been carried out through an online questionnaire-based survey. It contains three sections. The first section aims to collect demographic data of the respondents, such as gender, age, and occupation. The second is to identify the importance of each attribute from the respondent's perspective. It is designed in a two-column format: the first is intended for the focal firm and the second column is for its competitor. The last section has a three-column format, evaluating service quality performance. The first column asked about the service level provided by the focal firm, the second is for its competitor, and the third column asked the respondents to denote their desired service levels.

The participants of this survey were required to have experience with the focal firm and its competitor. All statements are measured on a 5-point Likert-type scale, ranging from 1 which is strongly disagree for performance-type questions or the third section—or is very unimportant for importance-type questions or the second section) to 5 (which is strongly agree for performance-type—or is very important for importance-type questions). One hundred and forty participants have participated. However, only one hundred and seven data are considered valid due to the fact that the respondents have to have experience in doing transaction at both service providers: the focal firm and its competitor. About 65.4% of them are female and 34.6% are male. Most of the respondents are students (67.3%) with 81.3% of the respondents are around 16-25 years old.

The reliability test with Cronbach's alpha (Cronbach 1951) was calculated before analysing the questionnaire further. All attributes have Cronbach's alpha values more than 0.7; indicating reliable questionnaire (Nunnally 1994) (detailed values: focal firm's importance is 0.929, competitor's importance is 0.927, focal firm's importance is 0.959, competitor's importance is 0.955, and the desired service is 0.907).

3.1. CZSQ Result

Based on the calculation that has been performed for all 21 attributes, the scores of CSA and CZOT are found by averaging all values that have been obtained throughout all respondents (see Table 1). Then, the values of CZSQ are computed from CSA and CZOT (see Equation (1)), with respect to each attribute. The difference in gap *d* is calculated by subtracting DI to CZSQ.

Table 1. CZSQ result.

Dimensions and Attributes		CSA	CZOT	CZSQ	DI	*d*
Technical protections	KT1	0.08	0.79	0.11	0	0.11
	KT2	0.07	0.76	0.10	0.01	0.09
	KT3	-0.07	0.70	-0.09	0.02	-0.11
	KT4	-0.05	0.66	-0.07	0.04	-0.11
	KT5	-0.03	0.68	-0.04	0.06	-0.10
	KT6	-0.03	0.87	-0.03	0.04	-0.07
Transaction procedures	PT1	0.06	-0.23	-0.24	0.03	-0.27
	PT2	-0.03	0.16	-0.18	-0.01	-0.17
	PT3	-0.03	0.43	-0.07	-0.01	-0.06
	PT4	0.02	0.40	0.05	0.03	0.02
	PT5	0	0.26	0	-0.03	0.03
	PT6	-0.07	0.19	-0.35	-0.02	-0.33
Security statements	PK1	0	0.61	0	0.03	-0.03
	PK2	0.05	0.53	0.09	0.01	0.08
	PK3	-0.01	0.54	-0.02	0.02	-0.04
	PK4	0.02	0.54	0.03	0	0.03
	PK5	-0.01	0.54	-0.02	0.01	-0.03
	PK6	-0.02	0.45	-0.04	-0.02	-0.02
Perceived trust	K1	0.03	0.87	0.03	0	0.03
	K2	0.01	0.93	0.01	0.02	-0.01
	K3	0.03	0.86	0.03	0.04	-0.01

The lowest score of CZSQ is attribute PT6 which is -0.35. It seems that the respondents feel dissatisfied with the service confirmation to guarantee them that the payment was received. By looking at the *d* value, which is negative, i.e., -0.33, the performance of the focal firm for this particular attribute is worse than its competitor. Apparently, the focal firm did not send the confirmation (through e-mail or mobile phone message) to the customers; in fact, the pop-up notification is the only report sending to the customers. On the other hand, apart from pop-up notification, the competitor also sent an e-mail reporting that the payment has been received. The attribute that has the highest score of CZSQ is KT1 with 0.11. It seems that the respondents were satisfied but the performance of the focal firm has not yet reached their highest expectation. Since the value of DI is 0 (zero), it means that the importance is equal for both the focal firm and its competitor. Fortunately, the focal firm can be proud of itself due to the fact that the respondents saw this attribute's performance is better than its competitor.

In technical protections dimension, only two (out of six attributes), i.e., KT1 and KT2, have positive values of CZSQ and *d*. It means that the focal firm should improve its security during the transaction process since its performance is worse than its competitors (from the respondents' point of view). Akin to the first dimension, the second dimension, i.e., transaction procedure, has only two positive values of CZSQ and *d*, i.e., PT4 and PT5. Later attribute has value of CZSQ equals to 0 (zero)—similar to PK1 in security statements dimension—meaning that performance of the focal firm is assessed exactly the same with performance of its competitor, so that no matter what the value of CZOT is, the CZSQ will equal to 0 as well. As a consequence, the value of *d* (only) depends on the value of DI. In the third

dimension, i.e., security statements, three out of six attributes have negative value of CZSQ: PK3, PK5, and PK6. Those mean that the respondents found it is somewhat difficult to look for security statements in the application or the website. Moreover, since *d* values also negative, it means that the performances of these particular attributes are worse than the competitor's performance. In the last dimension, i.e., perceived trust, all attributes have value of CZSQ more than 0 (or positive). It means that the respondents viewed this dimension is delightful and they trust the focal firm. However, compared to the competitor, only attributes K1 is perceived better (the *d* value is positive). Since there are plenty of things must be improved by the focal firm, prioritization of what attributes should be developed will be provided in the subsequent subsection.

3.2. CZIPA Result

CZIPA diagram is used to launch key strategies to earn customer satisfaction according to the performance (CZSQ) and the difference in importance (DI) of the attributes from the customers' perspective. It merges the importance and performance facets on a diagram to provide an insight through the performance of the focal firm corresponding to its difference's importance. To create the CZIPA diagram, the average score of each attribute were mapped in the two-dimensional state space. The horizontal axis is the CZSQ value that have been calculated previously, while the vertical axis is the DI. The diagram is then divided into four quadrants (see Section 2.3 for the explanation of each quadrant). The CZIPA diagram is used to provide recommendations on what attributes should be the main focus to be improved by the firm. The result can be seen in Figure 3.

There is no attribute at the fourth quadrant, i.e., possibly overkill. If there is (are) attribute(s) located in this quadrant, it means that the attribute(s) is(are) considered as having high performance but having low difference in importance. It means that the management puts too much attention to the attribute(s) so that it(they) is(are) regarded as unnecessary activity(ies) and recommended to be eliminated because of disproportionate investment. Four attributes belong to the third quadrant. Those are PT2, PT3, and PT6 in transaction procedure dimension, and PK6 in security statements dimension. These attributes indicate to the performances of the focal firm that are not pretty satisfactory and they are considered as not important from the perspectives of the respondents. Even though these attributes can be seen as under-performing, however, since they are labelled as not important, it is highly recommended that the management should not invest that much to pursue the improvement of the corresponding attributes. There are five attributes located on the second quadrant. They are KT2 in technical protections, PT4 in transaction procedure, PK2 in security statements, and K2 as well as K3 in perceived trust dimension. The respondents believed that the attributes are considered important and the focal firm has performed the good service. Generally speaking, it means that the management should preserve these attributes to maintain and enhance customer satisfaction.

The most essential quadrant comparing to others is the first quadrant. Attributes belong in this quadrant seem to perform low but somehow importantly perceived by the customers. The focus of the focal firm's improvement agenda to achieve customer satisfaction should be these attributes. Unfortunately, there are eight attributes from four dimensions belong to this quadrant, i.e., KT3, KT4, KT5, KT6 in technical protections dimension, PT1 in transaction procedure dimension, as well as PK1, PK3 and PK5 in security statements dimension. Recommendations to improve the performance of these attributes are given in the next paragraph. Note that there are five attributes located in the crosshair, i.e., KT1, PT5, PK1, PK4, and K1, meaning that these attributes are sensitive to the change in information.

The following are recommendations for improvements that are suggested. Management should replace the manual confirmation step with fingerprint detection. Using fingerprint detection will make it easier for consumers to log in to the service. In addition, the security will be safer than using a password that is considered time-consuming by the customer. The technical division should continue to make improvements to the application, both from the QR scanner and from the system within the application, so that the application can display prices as they are billed. In addition, the management must also continue to update the price available on the application with the price available at the merchant so that no price difference might occur. The management should use the latest security system. The recent security system is considered to be easy for hackers to hack into the security of e-payment. Management could hire competent staff to create a security system that is sophisticated and difficult to be penetrated. The application should be used smoothly at any time and under any condition. The management also should provide customer service that is ready to serve 24 hours. The application should have a small memory and not too heavy in order to avoid any lag on the smartphone that might occur. Finally, the application updates should be done frequently to avoid bugs.

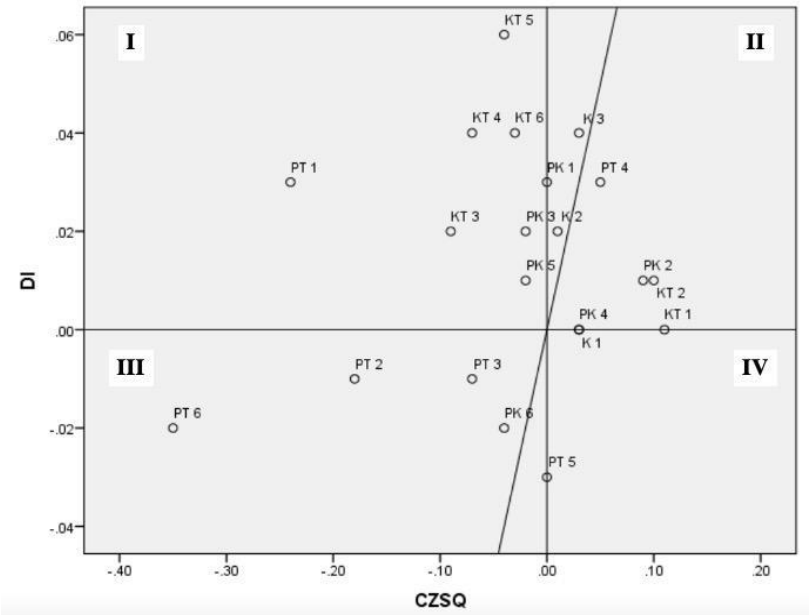


Figure 3. CZIPA diagram of the focal firm.

4. Conclusion

This study has shown the process of assessing the service quality of an e-wallet application using CZSQ and CZIPA diagram. A case study to demonstrate the applicability of the methods also has been provided. The result indicates that the assessment has definitely many potential benefits for the manager of the focal firm. There are ten attributes (out of 21) that have value of CZSQ more than 0 (zero). It means that the management needs to improve the service to be delivered to the customers. To perform a selection in terms of which attributes have to be enhanced so that customer satisfaction can be achieved, the focal firm may employ CZIPA diagram to discover how the customers perceive the attributes. Notice that not all attributes must be simultaneously improved, because it can decrease the enormous amount of finance spent by the service provider. Only the attributes that belong to the first quadrant (and have value of d less than zero that immediately are needed to be bettered). Recommendations have been given (see Subsection 3.2) for eight attributes located in the first quadrant. The methods, however, are considered uncomplicated to be implemented, relatively simple to interpret, and a low-cost solution. It will potentially become benefits for the service provider since it assures them to gain valuable insights related to which attributes that are recommended to be enhanced based on their importance and performance scores according to the perspective of the customer.

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