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Causal Loop Diagram for Better Understanding of Customer Satisfaction in The Indonesian Public Service

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ABSTRACT

In Indonesia, public service providers were mandated to measure consumer satisfaction in improving the quality of their services. It could help the organization to establish the priority of areas that need to be improved. On the other hand, the customer satisfaction index is frequently analyzed using a linear thinking technique, in which an event is continuously seen from a particular point of view, perhaps leading to policies that are contrary to what the customer expects. This research aimed to adopt a more systematic approach for better understanding the structures that generated customer satisfaction, so the various policies could be designed to address the problems that arise. A causal loop diagram (CLD) was used to describe the feedback structure of interrelationships among variables, allowing for identifying the structure that generated customer satisfaction. The structure showed how customer satisfaction was formed and how it affected other variables. The conceptual CLD is a mental map constructed to highlight various cause-and-effect interactions and to disclose some relationships between customer satisfaction variables that are important in policymaking related to customer satisfaction.

Keywords: Causal Loop Diagram, Customer Satisfaction, Policy, Public Service, System Thinking

JEL Classification: C32, C63, D73, D78, J28

INTRODUCTION

Public service law No. 25/2009 mandated that all public service providers give the highest quality services to their customers, also known as excellent services, to meet customer needs and expectations. People experience satisfaction when they acquire something that matches their needs and expectations. Customer satisfaction with the delivery of public services was another term for customer satisfaction with the quality of government services (Pitaloka & Tannady, 2020). Every public service provider was encouraged to periodically evaluate its public services at least once a year to measure its performance. According to Ministry of State Apparatus Utilization and Bureaucratic Reform Regulation No. 14/2017 concerning guidelines for preparing community satisfaction surveys of public service administration units, there were 9 (nine) dimensions indicators to measure customer satisfaction from the ratio of customer needs and expectations; this included: 1) registration requirements, 2) system, mechanism and procedures, 3) service settlement time, 4) services fee, 5) product service, 6) officer competencies, 7) officer attitudes, 8) complaint handling system, 9) support facilities that public services providers in Indonesia used.

As a technique for measuring customer satisfaction in Indonesian public services, the customer satisfaction surveys are currently analyzed using a linear thinking approach. Linear systems commonly derive inferences based on data trends in a given context using a particular point of view. Developing policies to fix the problem, according to Sterman (2000), could have unexpected effects. The decision might prompt a reaction to a subsequent event to restore the unstable condition. Policy resistance, or the tendency for interventions to be delayed, weakened, or dominated by the system's response to the intervention, was frequently the result of these unexpected, chaotic processes. One of the reasons for policy resistance was the desire to frame experiences as a series of events. Policy resistance was also driven by a lack of understanding of the system's inputs. Each action had its own set of consequences. The main effect was the primary consequence or the intended result. However, unexpected consequences or side effects served to weaken policies and undermine the system. The existence of side effects revealed a poor and incomplete understanding of the system. It should avoid since it can cause some problems, such as policy consequences that aren't expected. Furthermore, a bottleneck might develop because the regulations demand action from other stakeholders, but those parties could not respond. In addition, it could also lead to disagreements as a result of dissatisfied stakeholders.

Some public service providers were having difficulty making integrated judgments that would increase or decrease customer satisfaction. It was due to decision-makers limited resources and technological capabilities for predicting and evaluating the repercussions of their decisions. Causal loop diagrams were required to comprehend the overall structural scenario and investigate the feedback between variables that affected customer satisfaction to address decision-making challenges (Abdollahiasl et al., 2014). As a result, the organizations should broaden their mental models to comprehend the feedback structure of interrelationships among variables, allowing them to identify the structure that generated consumer satisfaction.

We conducted this study to investigate the structure that generates customer satisfaction in public service by studying the interactions between variables, using the case from one of the public service units in the Indonesian Food and Drug Authority (FDA). A causal loop diagram is a concept for detecting feedback generated due to a causal relationship between variables. The conceptual CLD is a mental map created to emphasize numerous cause-and-effect interactions and demonstrate some of the relationships between customer satisfaction variables that are important in the formulation of policies.

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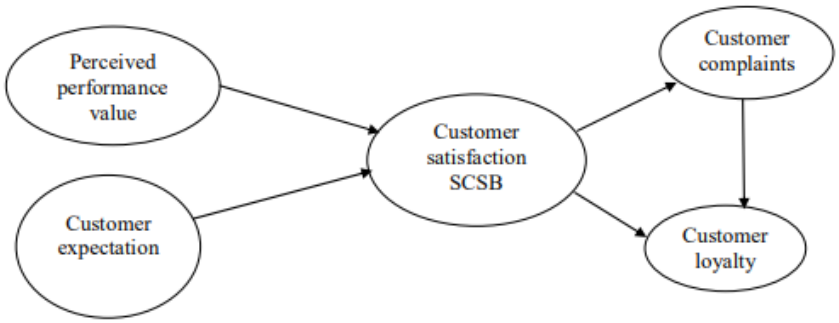
LITERATURE REVIEW

The system dynamics model has been used to investigate the structure of the variables that influence customer satisfaction in several circumstances. According to Octabriyantiningtyas & Suryani (2019), satisfaction is defined as a person's pleasing emotion or disappointment over the contrast of perceptions of product performance in relationships or expectations. Kuo et al. (2009) define customer satisfaction as "consumers' overall perception of their consumption." Furthermore, customer satisfaction has a significant impact on post-purchase intentions and customer behavioral intentions. The quality of the services offered is one of the most important antecedents of satisfaction. According to Ardani et al. (2019), the consequences are determined mainly by customer loyalty. The customer satisfaction paradigm, as well as its antecedent and consequence, has been widely adopted in several nations.

1. Swedish customer satisfaction barometer (SCSB)

Sweden is the first country in the world to measure customer satisfaction on a national level. CSB is a customer satisfaction index based on annual survey data from a variety of businesses. SCSB describes that increasing customer satisfaction can lead to a drop in complaints and increased customer loyalty (Fornell, 1992). SCSB is shown in figure 1.

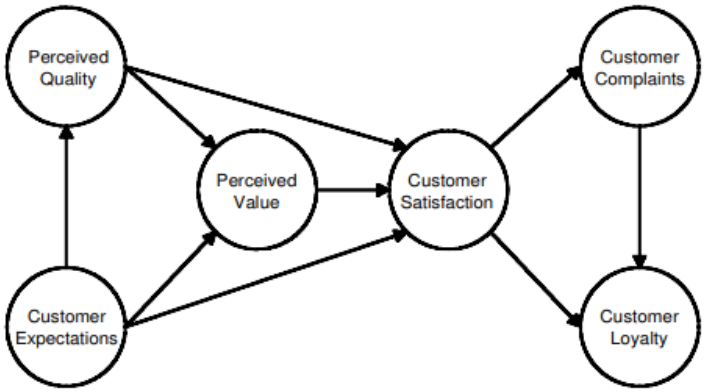
Figure 1. Swedish customer satisfaction barometer (SCSB). (*Johnson et al. 2001*)



2. American customer satisfaction index (ACSI)

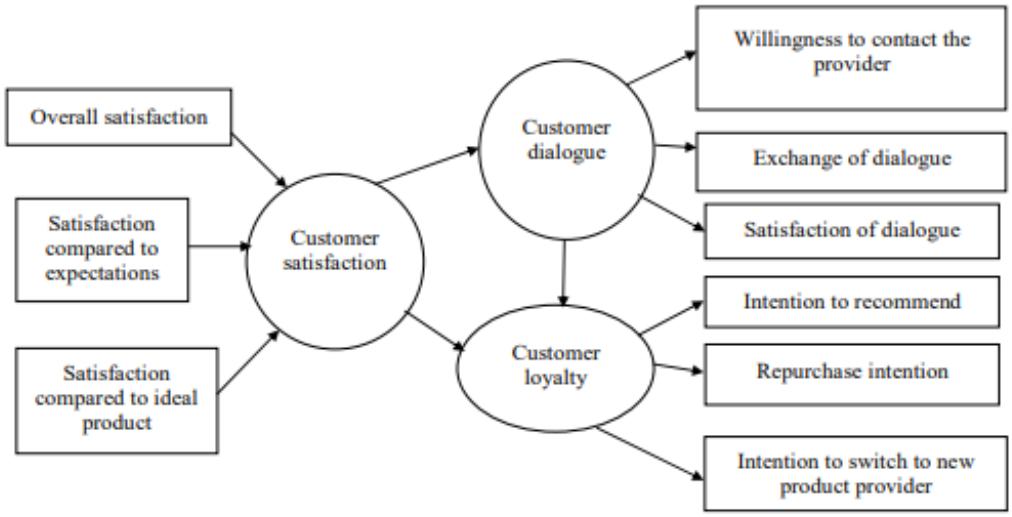
Customer interviews were used to create the American Customer Satisfaction Index (ACSI) in 1994. The ACSI model is a causal model containing customer expectations, perceived quality, and perceived value indicators. Overall customer satisfaction was also evaluated as a determinant of customer complaints and loyalty (*The American Customer Satisfaction Index Science and Methodology*, 1994). ACSI is shown in figure 2.

Figure 2. American customer satisfaction index (ACSI).
(*The American Customer Satisfaction Index Science and Methodology, 1994*)



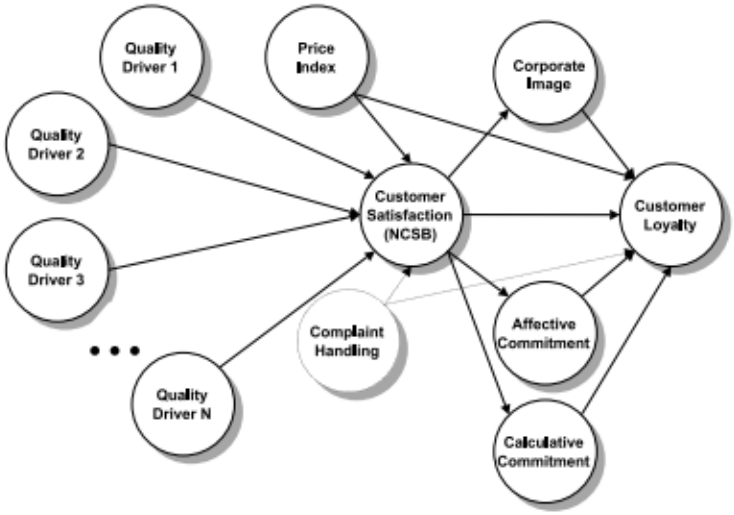
3. Switzerland customer satisfaction index (SWICS)
Bruhn & Grund (2000) created the Switzerland customer satisfaction index (SWICS). This model explained that customer loyalty is highly dependent on customer satisfaction with the primary product or service. Customers will switch and choose other alternatives if there are problems with the company's or service provider's core competencies. Customer dialogue is essential for customer loyalty if the core product/service is comparable and similar. SWICS is shown in figure 3.

Figure 3. Switzerland customer satisfaction index (SWICS). (*Bruhn & Grund, 2000*)



4. Norwegian customer satisfaction barometer (NCSB)
The Norwegian Customer Satisfaction Barometer (NCSB) aimed to create a variety of customer satisfaction indexes. NCSB examined the role of corporate image and its interaction with customer satisfaction and loyalty. It recommended customer loyalty as the reference standard of consumer satisfaction since loyalty emerges directly from price and/or quality (Johnson et al., 2001). NCSB is shown in figure 4.

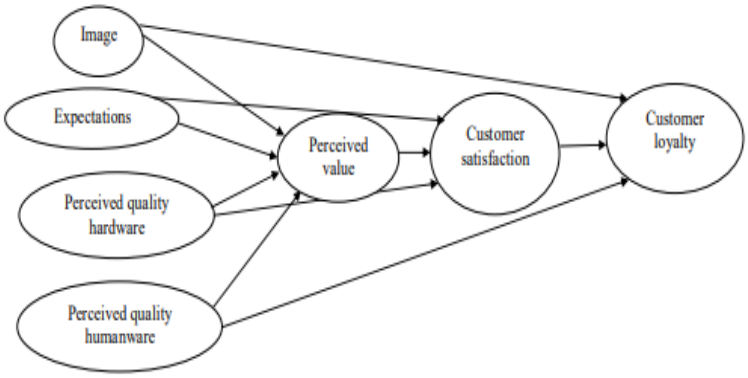
Figure 4. Norwegian customer satisfaction barometer (NCSB). (*Johnson et al., 2001*)



5. European customer satisfaction index (ECSI)

In Denmark, Kristensen et al. (2000) applied the ECSI model to assess consumer satisfaction. The model works effectively and appears to be adaptable to various sectors. This model considers perceived quality, as well as product and service factors. ECSI is shown in figure 5.

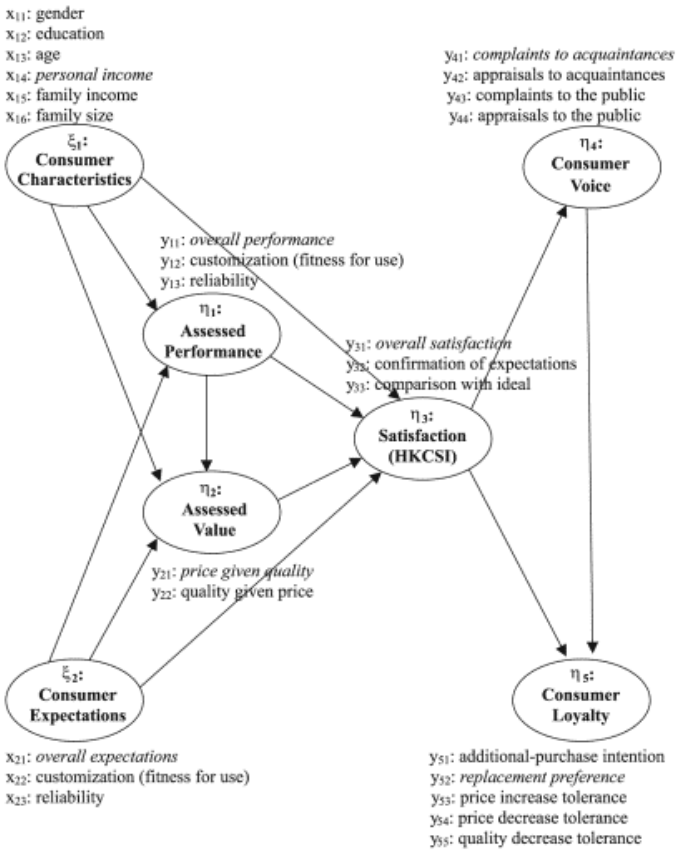
Figure 5. European customer satisfaction index (ECSI). (*Kristensen et al., 2000*)



6. Hong Kong consumer satisfaction index (HKCSI)

The HKCSI was created by Chan et al. (2003) using data from a comprehensive survey performed in Hong Kong between 1998 and 2000. The model was initially influenced by Swedish and American practices but modified to fit Hong Kong's unique economic structure. HKCSI is shown in figure 6.

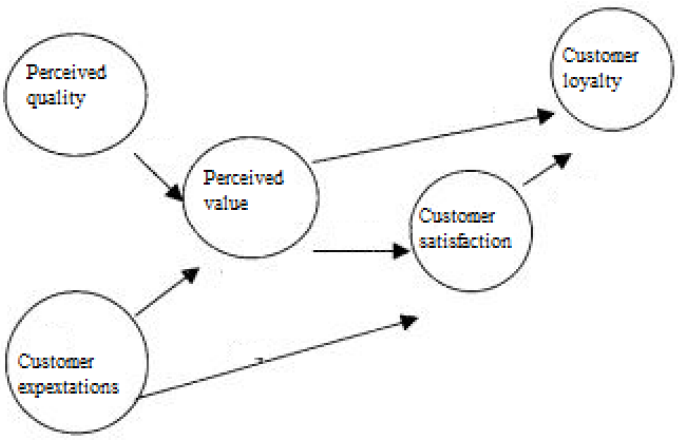
Figure 6. Hong Kong consumer satisfaction index (HKCSI) (*Chan et al., 2003*)



7. Kanji customer satisfaction index (KCSI)

Customer expectation and perceived quality are the antecedents of perceived value. When a customer is satisfied, it will lead to customer loyalty. Winnie & Kanji (2001) used a Customer Satisfaction Index approach to study consumer satisfaction in retail banking in Hong Kong. The KCSI is sown in figure 7.

Figure 7. Kanji customer satisfaction index (KCSI) (*Winnie & Kanji, 2001)*

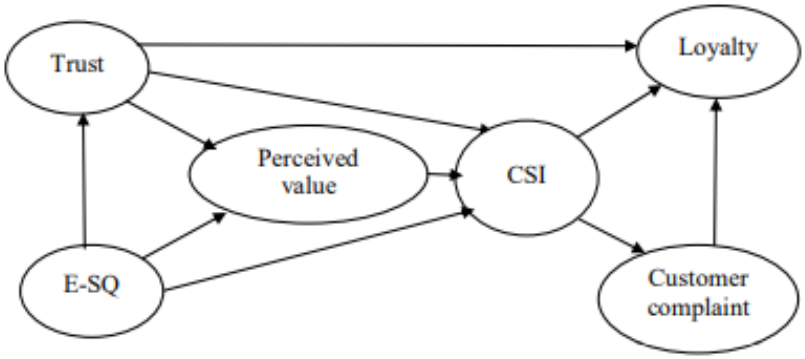


8. Electronic customer satisfaction index (e-CSI)

Taiwanese researcher Hsu (2008) investigated consumer online shopping behavior at Taiwan's largest online retailer. e-CSI (Electronic customer satisfaction index) model

based on the ACSI model was presented and evaluated by the researcher. It found that online retailers should invest in a robust and quick customer complaint handling system. e-CSI is shown in figure 8.

Figure 8. Electronic customer satisfaction index (E-CSI). (*Hsu, 2008)*



9. Customer satisfaction for public service in Indonesia

The customer satisfaction index was adopted from PERMENPAN RB no. 14/ 2017, which includes 9 (nine) dimensions indicators to measuring the ratio of customer needs and expectations: 1) registration requirements, 2) system, mechanism, and procedures, 3) service settlement time, 4) services fee, 5) product service, 6) officer competencies, 7) officer attitudes, 8) complaint handling system, 9) support facilities. Customer satisfaction in government services, according to Pitaloka & Tannady (2020), indicates the performance of government agencies.

Various CSI models from previous publications can be used to learn more about the relationship between feedback structures. The causal loop diagram depicts the feedback structure of the interrelationships between variables, enabling the identification of structures that drive customer satisfaction.

RESEARCH METHOD

The causal loop diagram (CLD) depicts the structure used to study dynamic interrelationships between variables. Two or more variables are linked together by an arrow-like link in a CLD. The components of a feedback loop are a circle of variables and their relation (Anderson & Johnson, 1997). Each causal relationship is given a polarity, either positive (+) or negative (-), to reflect how the dependent variable changes when the independent variable changes (-). The main loops are marked with a loop identifier, which indicates whether they are positive (reinforcing) or negative (balancing) feedback loops (Sterman, 2000). Using a dynamic system model to analyze customer satisfaction has more advantages than using a linear system. The CLD structure can be used to track down events to solve problems that have emerged. The CLD also displays the pattern of events, which is helpful for planning. An organization can use pattern detection to put the most recent occurrence in context with other similar events. The focus shifted from the specific event to examining how the chain of events is connected and the causes. To avoid problems created by the structure, the organization can decide on an appropriate intervention policy. Increasing customer satisfaction is an essential component of enhancing organizational performance, yet it is not the only technique. Therefore, it is necessary to comprehend the framework that leads to consumer satisfaction (Sahin et al., 2020).

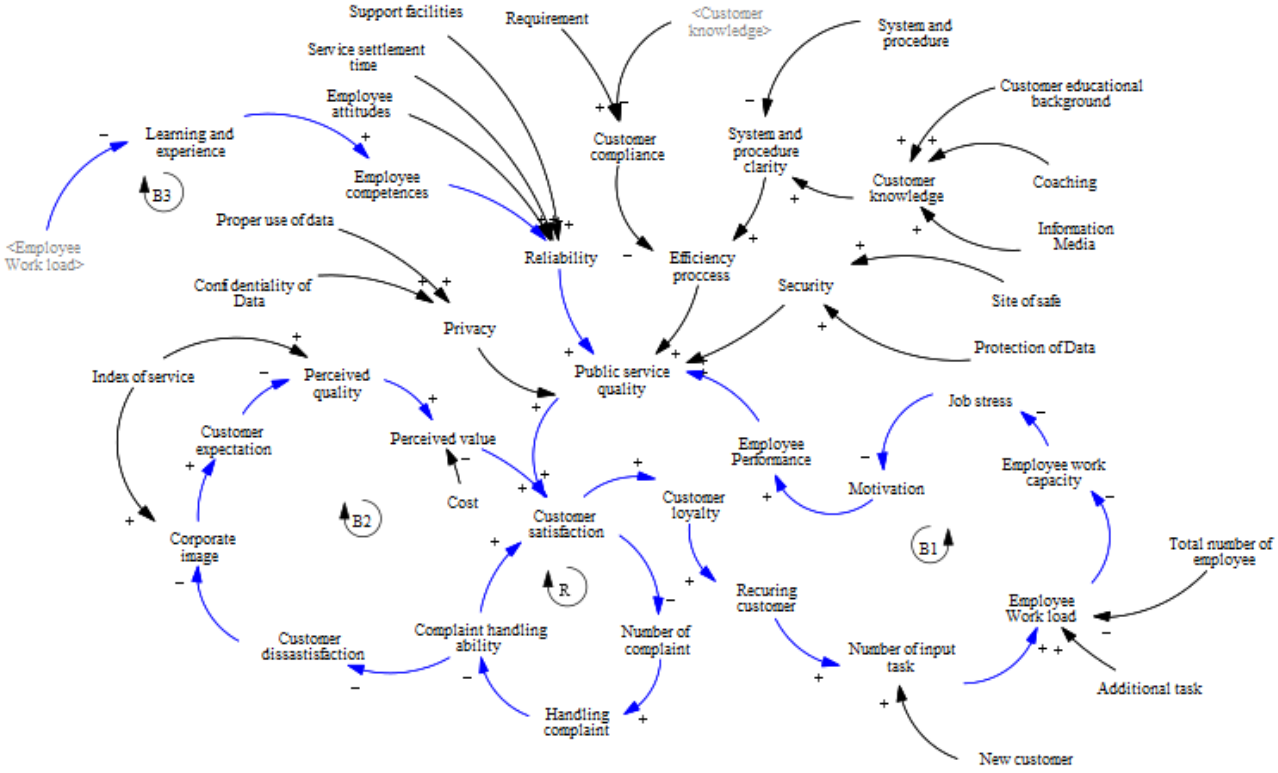
A scheme was established in a qualitative case study that combined variables from the previous research and a Focus Group Discussion (FGD) with 11 management

representatives in one of The Indonesian FDA public service units. Causal and feedback loops were created based on the primary findings. Finally, a causal loop diagram was built to represent the complex set of feedbacks that influenced the customer satisfaction system's public service policies and practices.

RESULTS

Based on the literature review and focus group discussion at one of the public service units at the Indonesian FDA, the structure that generated customer satisfaction in public services was presented in Figure 9.

Figure 9. Structures that generated customer satisfaction in public services



According to Segoro (2013), perceptions of service quality directly affected customer satisfaction, and as an organization improved service quality, customer satisfaction would rise. While customer satisfaction directly affects customer loyalty, customer loyalty could be maintained in an organization if customer satisfaction could be increased.

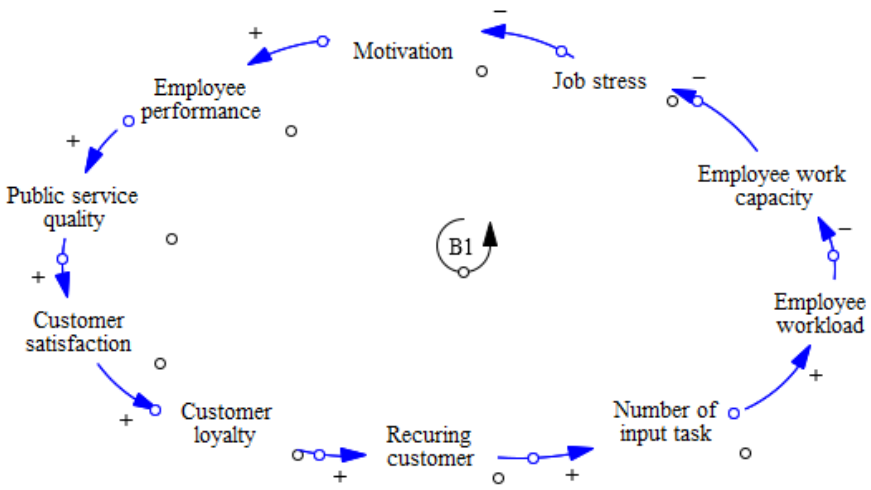
DISCUSSION

The structure was intended to serve as a decision support system for policymakers by examining interrelationships among variables. From the causal loop diagram, there were four essential feedback loops:

1. **Balancing 1 (B1):** Customer satisfaction affects loyalty (Octabriyantiningtyas & Suryani, 2019). Atmaja & Puspitawati (2019) also stated that service quality and customer satisfaction had a favorable and significant impact on customer loyalty. Because public service customers at the Indonesian FDA did not face competitors who offer the same service, loyalty translates to repeat service use from the customer. The number of tasks would increase as the number of current customers, and new customers grow. The employees' workload was determined by the total number of

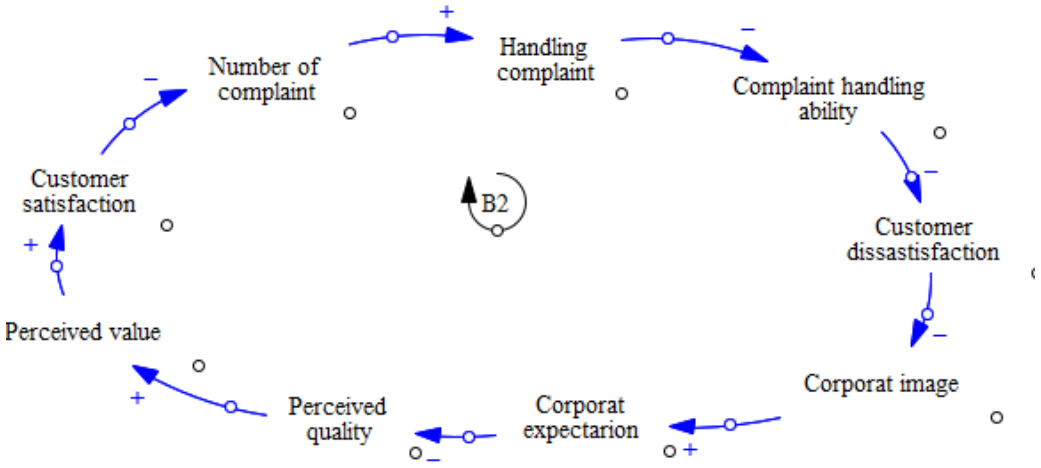
input tasks, additional tasks, and employees. Employees' capacity to accomplish work has reduced as their workload has increased. When Reduced employees' work capacity, they would experience more job stress and reduce their motivation to complete the task. All of these variables would have an impact on the employee's performance. When individuals harmed performance at work, service quality was affected (Jamil & Shaharanee, 2017). The structures aimed to determine the behavior of organization service quality that would impact customer satisfaction and loyalty, as shown by the model's conception through a causal loop diagram. Loyalty as a direct effect of customer satisfaction is shown in figure 10.

Figure 10. Balancing loop (B1) in customer satisfaction structures



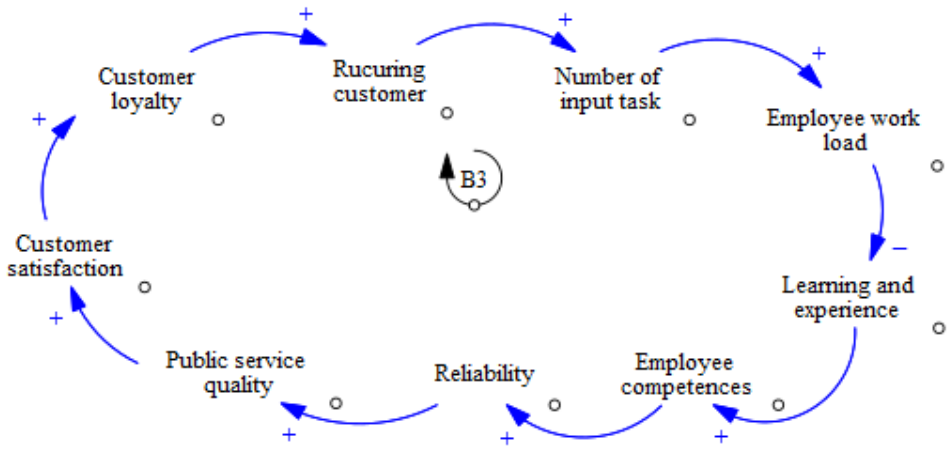
2. **Balancing 2 (B2):** According to Li et al. (2007), increasing customer satisfaction improved a company's image, but increasing customer dissatisfaction decreased a company's image due to the negative impacts of public disappointment. When a company's image improved, consumer expectations rose, resulting in a drop in perceived quality and value. It would lower customer satisfaction in the long run. Consumer expectations were a challenge to boosting customer satisfaction in this loop. According to Liu et al. (2006), the ability to handle complaints played a role as a filter, separating satisfied customers from those who file complaints. The ability to resolve customer complaints was critical to maximize customer loyalty while minimizing dissatisfied customers. Customer dissatisfaction reduced when the ability to manage complaints increased. The two system controllers, customer complaints, and the ability to handle corporate complaints were interconnected and interacted. By adequately managing complaints, organizations could enhance their performance and achieve their aim of converting dissatisfied customers into satisfied or loyal customers. Customers who complain frequently had high expectations of the organization and felt that it would listen to their concerns and used their feedback to enhance products and services. Customer complaints contained a wealth of information that allowed an organization to thoroughly understand its weaknesses and critical issues, such as service design, quality control, and management innovation, and is essential in providing customers with better satisfying products and services. The number of complaints as a direct effect of customer satisfaction is shown in figure 11.

Figure 11. Balancing loop (B2) in customer satisfaction structures



3. **Balancing 3 (B3)**: Addinna & Prasetyo (2018) stated that the core competency factor is based on a model consisting of capabilities, competencies, and resources. All three could be increased by the learning and experience process. Learning could be organized by enrolling in training classes or practicing on the job. However, a rise in the number of tasks assigned to staff could diminish the time available for training. Employees might devote most of their time to completing their work targets due to schedule pressure, limiting their learning chances. As a result, these issues hurt employees' competence to do their tasks. Employee competency directly impacted reliability; it could lower the quality of public services, which harmed customer satisfaction in public services (Alefari et al., 2020). Employee competencies and public service quality as a variable that affects customer satisfaction are shown in figure 12.

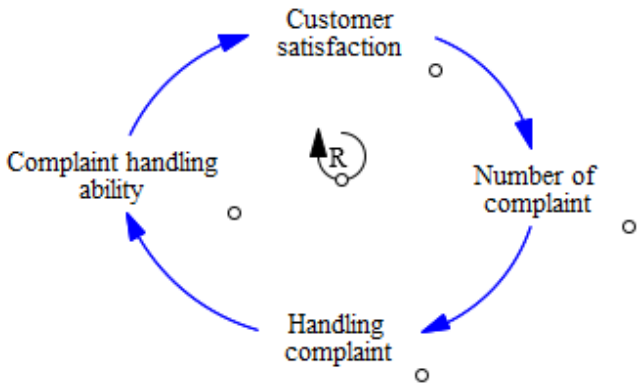
Figure 12. Balancing loop (B3) in customer satisfaction structures



4. **Reinforcing**: The effect of customer complaints on satisfaction, repeat uses, and loyalty was limited by the ability to handle complaints. Customers who file a complaint and are satisfied with the results are far more likely to use the service again than those dissatisfied but do nothing. As a result, if the number of complaints was excessively high, but the organization's ability to address them was inadequate, satisfaction would suffer. The organization should keep the volume of customer complaints below the

capacity to handle complaints. When a complaint becomes excessive, it would be incorrectly discarded or postponed. If an organization's complaints have been accumulated for an extended period, the organization's chances of reacting to them were limited, and a vicious circle of customer complaints would ensue, causing business disruption. As a result, the number of complaints and the ability to handle them should be balanced (Liu et al., 2006). In addition, the organization should also establish technical support to monitor communication and call center operators to handle complaints and track system improvements (Segoro, 2013). Complaint handling ability as a variable that affects customer satisfaction is shown in figure 13.

Figure 13. Reinforcing loop (R) in customer satisfaction structures



CONCLUSION

Organizations should understand the structures that promoted customer satisfaction to provide excellent service that led to customer satisfaction. A systematic literature review provided a summary of the antecedents and consequences of customer satisfaction from previous studies. These variables were paired with a Focus Group Discussion with management representatives from one of the Indonesian FDA's public service units to create a comprehensive framework that generated customer satisfaction using the causal loop diagram (CLD) approach. Complaint handling ability, public service quality, and customer expectations that could influence the perceived value of the public services provided are essential antecedents of customer satisfaction. Customer loyalty and customer complaints, on the other hand, were variables that occurred as consequences of customer satisfaction. This structure had four loops, three of which were balancing loops, and the rest was a reinforcing loop. However, there were still a lot of variables in the process of creating a customer satisfaction structure in public services.

The main contribution of this study was to identify the structure that generated customer satisfaction so that it could be utilized as a foundation for developing dynamic system simulations regarding a system's feedback relationship and dynamic behavior in the future study. As a result, the organization will establish several policies to improve customer satisfaction with public services.

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DECLARATION OF CONFLICTING INTERESTS

The authors declare that we have no conflict of interest.

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