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Abstract. Maintaining customer loyalty in business-to-business (B2B) markets is challenging, especially in industries with minimal product differentiation, such as the healthcare equipment sector in Indonesia. This study investigates the relationships between brand image, customer perceived value, switching costs, and loyalty in this context. Using Partial Least Square-Structural Equation Modeling (PLS-SEM), the authors analyze data from a survey of 224 private hospitals in Indonesia. The results reveal that brand image significantly influences loyalty, and this relationship is partially mediated by customer perceived value. Surprisingly, switching costs do not significantly moderate the brand image-loyalty relationship. The findings suggest that in the B2B healthcare equipment market, loyalty formation depends on both product-related factors (brand image and perceived value) and relational factors beyond the product itself. The study contributes to the literature by providing insights into the complex dynamics of loyalty formation in a unique B2B context and offers practical implications for healthcare equipment suppliers. Future research should consider expanding the geographical scope and investigating additional variables that may influence loyalty in this market.

Keywords: B2B; loyalty; customer perceived value; switching cost; healthcare equipment market
1. Introduction

The dynamics of supplier-consumer relationships in the context of Business to Business (B2B) commerce exhibits a complexity depends on the various business models. Unlike the direct approach commonly seen in B2C transactions, B2B enterprises typically adopt a more tailored approach towards their customer. They strive to cultivate closer relationship with customers and secure their loyalty, recognizing that B2B loyalty entails the involvement of multiple stakeholders within an organization (Naumann, Williams, & Khan, 2009). Decision making in B2B transactions is often collective, involving consensus among organizational members rather than individual choices (van Zeeland & Henseler, 2018). Successful enterprises acknowledge the importance of customer loyalty and allocate significant resources toward customer retention. However, it's important to recognize that customer loyalty continues to be a challenging concept to fully understand and cultivate, prompting numerous recent studies to explore this relationship (Ahmad, Jun, Khan, Abdullah, & Ghauri, 2016; Cassia, Cobelli, & Ugolini, 2017; Li, Yen, & Liu, 2020; Neupane, 2015). Establishing enduring relationships necessitates the delivery of consistent added value (Čater & Čater, 2010), a task particularly challenging in industries characterized by minimal product differentiation, such as healthcare equipment market in Indonesia.

Although there are numerous factors influencing the formation of customer loyalty, brand image of the product holds considerable significance for stakeholders in B2B organizations, notably enhancing brand engagement, attitude, and consumer awareness (Ansary & Nik Hashim, 2018). Elements of brand image, including product reputation, brand familiarity, and product excellence, have been consistently linked to loyalty in various empirical studies in the healthcare sector (see for instance Paradilla et al., 2022; Yin et al., 2022) and non-healthcare sector (see for instance Cassia et al., 2017; Chang, 2020; Sharma, 2020; Taylor et al., 2004). Brand image impacts loyalty in B2B settings because it is built upon the brand equity of a corporation, derived from the products and services offered by that corporation (Juntunen, Juntunen, & Juga, 2011).

Despite the undeniable relationship between brand image and loyalty, the connection is not always straightforward. Extensive findings suggest an indirect association, where brand image influences loyalty through customer perceived value derived from product satisfaction, perceived benefits, value for money, or emotional attachment, subsequently impacting loyalty (Hasby, Irawanto, & Hussein, 2018; Janita & Miranda, 2013; Pham & Nguyen, 2019). However, alternative research suggests that brand image can also directly affect loyalty, implying that customer loyalty formation may depend not only on product attributes but also on the relational experience between supplier and consumer (Cassia et al., 2017). As a result, partial mediation through perceived product value is more common in service markets than in product-based markets (Cassia et al., 2017). In the healthcare equipment market, the relationship between brand image and loyalty becomes more ambiguous due to its unique market structure. healthcare equipment suppliers trade products manufactured by various brands, with one product often distributed by multiple suppliers. Despite these suppliers marketing products to their respective consumers, the products themselves have minimal differentiation from competitors. Given the lack of differentiation in the industry, the market operates on both product- and service-based. Suppliers may rely not only on the quality of their products but also on the additional value they can offer to customers. Consequently, whether loyalty fully mediated through the perception value of the product is uncertain. In addition, limited studies have attempted to analyze the dynamics between loyalty and brand image with minimal product differentiation such as healthcare equipment market.

In addition, the availability of substitute products and multiple supplier options enable hospital consumers to switch from one supplier to another or even from one product to another. Not only is losing consumers detrimental to suppliers, but this transition is also not easy for consumers due to various considerations related to their long-standing relationships with suppliers, who have been their
business partners for a significant period. This is because purchasing diagnostic equipment in the healthcare industry differs from products traded in the Business to Consumer (B2C) market. Hospitals, as business consumers, require support from suppliers regarding after-sales services and daily operational support for the products they use to enhance hospital performance in providing healthcare services to patients. Switching to other suppliers and products may incur costs for business consumers, both tangible and intangible (Blut, Beatty, Evanschitzky, & Brock, 2014; El-Manstrly, 2016; Shen & Ahmad, 2022). These costs are known as switching costs. The impact of switching depends on the type of business. However, in the healthcare equipment market, which usually requires not only the cost of sales, the influence of switching costs on loyalty remains understudied.

To conclude, customer loyalty in B2B markets is crucial, yet cultivating it remains challenging. As previously mentioned, several factors, such as brand image and switching costs, have been identified as important. However, while brand image significantly influences loyalty, the relationship is not always straightforward; it can be direct, fully mediated, or partially mediated. Additionally, the role of switching costs in Indonesia’s healthcare equipment market remains underexplored. If significant, switching costs could provide insights into how they might hinder loyalty. Therefore, using Structural Equation Modeling - Partial Least Squares (SEM-PLS) methodology, this study aims to address these gaps by examining the dynamics between brand image, customer perceived value, switching costs, and loyalty in Indonesia's B2B healthcare equipment market. Our research will center on private hospitals. Unlike public hospitals, which are often restricted by decisions involving multiple stakeholders, private hospitals possess autonomy in shaping their management strategies within the competitive healthcare industry landscape (Ghandour, Siciliani, & Straume, 2022). Moreover, the private hospital sector dominates the hospital business, with more than 60% of hospitals in Indonesia being privately owned and experiencing continuous growth (Ministry of Health Republic Indonesia, 2022). Therefore, understanding the behaviors and characteristics of private hospitals in fostering loyalty provides invaluable insights into the healthcare equipment market.

This study offers several significant contributions: Firstly, the finding can contribute on the debate of the dynamic relationship between brand image, loyalty, and perceived value in the B2B context on healthcare and diagnostic equipment business. This is crucial given the limited discussion on these variables in the B2B context, especially within the healthcare equipment market. Secondly, the study's exclusive focus on private hospitals adds relevance and significance to its findings, as loyalty studies in the healthcare business typically combine private and public hospitals, resulting in biased outcomes due to their different business orientations. Thirdly, the study identifies the role of switching costs in loyalty within the healthcare equipment market, a factor often overlooked in loyalty studies, especially in the business that requires long term relationship as it needs maintenance services. Lastly, the study's use robust sample size of hospitals, ensures reliable findings to explain its conclusions. This study is important so that healthcare equipment suppliers able to understand how to retain their consumers by cultivating loyalty toward them to ensure business continuity.

In the following sections, we will explore the relevant literature review, formulate hypotheses, outline the methodology utilized, and provide an analysis of the results. The study will conclude with a discussion on the research implications and potential limitations.

2. Literature Review and Hypothesis Development


The growth and development of healthcare diagnostic equipment suppliers in Indonesia have influenced the attitudes of private hospitals in making purchasing decisions. This is due to the increasing availability of alternative product brands and suppliers. Efforts to achieve loyalty pose a unique challenge in industries where competitors lack significant product differentiation. This challenge is
experienced by healthcare equipment suppliers who trade their products to healthcare service providers such as hospitals.

Brand image portrays the attributes of a brand directly associated with its identity, reputation, and product excellence (Alhaddad, 2015). Several studies indicate that buyers in B2B world are highly sensitive to brand image, especially in complex purchasing processes characterized by high technical uncertainty (Mudambi, Doyle, & Wong, 1997; Walley, Custance, Taylor, Lindgreen, & Hingley, 2007). Brand image is undoubtedly one of the crucial factors in fostering loyalty (Kaur & Soch, 2018; Neupane, 2015). However, how brand image translates into loyalty remains a question. Extensive studies argue that brand image is mediated by consumer perceived value in achieving loyalty (Elsäßer & Wirtz, 2017; Kim & Hyun, 2011). Perceptions of brand image occur through interactions with the brand and experiences using it over a certain period, which impact perceptions and loyalty (Y.-Y. Chang, Lin, Yen, & Hung, 2020; Kim & Hyun, 2011). Thus, when consumers have a positive perception of a brand's image, it is expected that their loyalty to the product brand will significantly increase.

For example, research in the hospitality industry in Vietnam, where online travel agents sell service products, found that brand image positively influences perceived value. Brand image is built from the quality of features presented on the online travel business website, perceived benefits, product pricing, duration spent searching for suitable products by consumers, efforts made to compare accommodation service products, and the risks associated with transacting online (Pham & Nguyen, 2019). Another study in the retail transportation industry found that the brand image of a corporation and its products significantly impacts perceived value (Hasby et al., 2018). In the context of electronic marketplace sales in Spain, a study conducted on 197 e-marketplaces found that perceived value strengthens the relationship between brand image and loyalty (Janita & Miranda, 2013). Research in the transportation sector on users of online vehicles indicates that brand image plays a primary role in the service industry and significantly influences consumer decisions to make repeat purchases or transactions with the same service provider. Consumers perceive value from this brand image and evaluate the trade-off between the costs incurred and the benefits received, leading to a distinct value in the minds and memories of customers, which can strengthen the relationship between brand image and the intention of customers to make repeat transactions (Hasby et al., 2018). Based on these comprehensive studies, we suggest that brand image influences loyalty mediated by customer perceived value.

While many studies suggest an indirect effect through customer perceived value, ambiguity arises as to whether the brand image of the product or service sold will influence loyalty fully mediated through customer perceived value or not. Fully mediated implies that the brand image of the product influences loyalty through a more elaborated, cognition-based mechanism (Fabrigar & Petty, 1999). However, research has indicated that B2B brand image also directly and positively affects loyalty even with the present of perceived value mediator (Juntunen et al., 2011; Taylor et al., 2004), suggesting that there are additional factors influencing loyalty beyond the embedded value in the product. Studies show that goods-related brand image tends to be fully mediated in influencing loyalty because the brand is embedded in the goods sold through discrete transactions to deliver a highly valued items (Merz, He, & Vargo, 2009). Consistent with this viewpoint, the brand image associated with goods has a direct impact on customer satisfaction and value, subsequently influencing customer loyalty (Vargo & Lusch, 2008). Meanwhile, the service-related market not only influences customers through their product but also the results of co-creation experiences (Cassia et al., 2017). Customer value on the product is not sufficient to explain the brand image-loyalty relationship (Akaka & Vargo, 2015). Thus, the service-based market usually only partially mediates with the product perceived value (Cassia et al., 2017). This perspective, however, is ambiguous in the Indonesian healthcare equipment market as they have lack of product differentiation, which makes them not only rely on the value of the products. Based on this reasoning, we suggest that the brand image also has a direct link to customer loyalty.

H1: Brand image significantly directly influence customer loyalty
**H2**: Brand image significantly directly influence customer perceived value

**H3**: Customer perceived value significantly directly influence customer loyalty

**H4**: Customer perceived value mediate the relationship between brand image and loyalty

### 2.2. The Role of Switching Cost in Shaping Loyalty

Switching costs are the expenses associated with changing suppliers that influence business consumer purchasing decisions (Bergel & Brock, 2018; Blut et al., 2014; Burnham, Frels, & Mahajan, 2003; Shen & Ahmad, 2022). Switching costs are not solely monetary; they also encompass considerations of time, effort, and psychological aspects when dealing with the uncertainty of a new service provider (Dick & Basu, 1994). Additionally, switching costs refer to the estimated loss or sacrifice of resources such as time, energy, and money, associated with transitioning from one service provider and product to another (Wong, Chang, & Yeh, 2019).

Previous research on the relationship between brand image and loyalty concluded that the moderation of switching costs significantly impacts the relationship between brand image and consumer loyalty (Blut et al., 2014; El-Manstrly, 2016; Machado & Pinheiro, 2014). As the perception of the high cost of switching increases, consumers’ perceptions of brand image and loyalty also increase (Sharma, 2020). Another study by Machado & Pinheiro (2014), conducted in the context of B2B industries, explored the relationship between perceptions of product brand image related to product quality and consumer loyalty, moderated by switching costs. This research, conducted in the animal feed industry in Europe, demonstrates that the moderating effect of switching costs greatly influences the relationship between brand image and loyalty. Specifically, as the switching costs rise, consumers who prioritize product quality and are sensitive to it tend to be loyal to the supplier. Therefore, these switching costs emerge as crucial factors and serve as one of the strategies to retain customers for product and service providers. Nevertheless, there are limited studies assessing the moderating effect of switching costs in the healthcare equipment market. Therefore, this study assumes that switching costs play a significant role in the relationship between brand image and customer loyalty, similar to other sectors.

**H5**: Switching costs as a moderating variable significantly influence the relationship between brand image and customer loyalty.

### 2.3. Hypothesis Development

Drawing from the theory and empirical studies outlined in the preceding section, the relationship among brand image, customer loyalty, customer perceived value, and switching cost can be illustrated in the following diagram (refer to Fig.1).
3. Materials and Methods

3.1. Variables and Items
According to numerous researchers, brand image comprises elements perceived by consumers, which serve as indicators in this study, including: product reputation, familiarity, product excellence, and trustworthiness (Alhaddad, 2015; Alwi, Nguyen, Loh, & Liu, 2016; Cassia et al., 2017; W.-J. Chang, 2020; Plumeyer, Kottemann, Böger, & Decker, 2019; Shen & Ahmad, 2022). These aspects contribute to how consumers perceive and evaluate a brand's image, particularly in the context of medical devices. Meanwhile, the perceived value by B2B consumers is their response and feelings towards products, services, and their trust in the provider to meet their expectations (Callarisa Fiol, Moliner Tena, & Sánchez García, 2011; Corsaro & Snehota, 2010; Zauner, Koller, & Hatak, 2015). Indicators of perceived value in this research overview include: functional value of the product, price value paid, emotional value, social value, and relational benefits. These factors influence how businesses perceive the worth of products and services in meeting their needs and goals.

Switching costs encompass various dimensions such as procedural costs, time-related costs, monetary costs, and relational costs (Bergel & Brock, 2018; Burnham et al., 2003; Shen & Ahmad, 2022; Wong et al., 2019). These costs capture the investment required from businesses when transitioning to new suppliers or products, including the emotional aspects involved in ending existing relationships. Meanwhile, loyalty indicators utilized in this study include repeat purchases and recommending products or services to colleagues or friends (Cen & Li, 2019; Neupane, 2015; Paparoidamis, Katsikeas, & Chumpitaz, 2019; Reynoso, 2010). These actions reflect the extent to which B2B consumers are committed to a particular brand or supplier in the medical device industry.

The Likert scale ranging from one to five was employed in this research. The choice of a five-point scale is preferred when analyses are conducted using less complex techniques (Malhotra & Birks, 2015), ensuring simplicity and clarity in the assessment of responses from participants.

3.2. Partial Least Squares Structural Equation Modeling (PLS-SEM)
The study employs Partial Least Squares Structural Equation Modeling (PLS-SEM) to test the proposed hypotheses. PLS-SEM is suitable for this study as it is effective for exploratory research and can handle complex models with multiple relationships. PLS-SEM is applied usually to assess theory development in exploratory research, with a specific focus on exploring the variance of dependent variables within the model. In accordance with the research objective, which revolves around exploratory or theory development based on existing theories, this study employs PLS-SEM. Important to note that this method necessitates a relatively modest sample size, enabling the effective estimation of the model with a minimum sample size of 35 (Sholihin & Ratmono, 2013). The primary objective of this analysis is to test the hypotheses and formulate generalizations applicable to the entire population under examination.

The analysis involves a two-step approach: first, assessing the measurement model's reliability and validity, and second, evaluating the structural model's path coefficients and significance. In order to assess the suitability of all items in the research instrument for measuring the relationships among the variables under investigation, validity and reliability tests are imperative (Hair, Hult, Ringle, & Sarstedt, 2017). Validity testing of each item in the instrument aims to determine whether there is a significant relationship between the item and the total item score. An item is deemed valid when the coefficient significance test against the total item score yields positive results. Only valid items are deemed appropriate for inclusion in the research (Malhotra & Birks, 2015). Reliability testing serves as a measure to assess the consistency of the instrument. Essentially, validity test indicates whether this study accurately measures the intended model, while reliability test indicates the stability and consistency of the measurement. Validity and reliability testing are iteratively conducted until valid and reliable measurements are achieved, with this study employing two questionnaire distributions.

For validity testing, factor analysis is utilized as a widely accepted procedure for data reduction and summarization. Key to this analysis is the evaluation of the adequacy of sample values for factor loading.
in the component matrix. Factor loading indicates the simple correlation between variables and factors. A factor loading value ≥0.6 is indicative of questionnaire validity (Malhotra & Birks, 2015). Moreover, discriminant validity is assessed using the Fornell-Larcker Criterion to scrutinize the value of cross-loading factors, determining whether the constructs demonstrate sufficient discrimination. Construct validity is established when the constructs exhibit higher values compared to the loading with other constructs. Meanwhile, reliability testing is conducted using three measurement methods: Cronbach Alpha (α), Composite Reliability (CR), and Average Variance Extracted (AVE). Cronbach's Alpha assesses how closely related a set of items are as a group, indicating that the items measure the same underlying construct. CR, similar to Cronbach’s Alpha, provides a more accurate assessment of the internal consistency of the latent construct. AVE assesses the convergent validity of a construct, indicating the extent to which the indicators represent the latent construct. A latent variable is considered reliable if Cronbach Alpha exceeds 0.6, the CR value exceeds 0.7, AVE exceeds 0.5 for all variables.

3.3. Data Sampling
This research was conducted across six provinces on the island of Java, namely DKI Jakarta, Banten, West Java, Central Java, Yogyakarta Special Region, and East Java, focusing on private hospitals. The study was carried out between August 2023 and November 2023. There are a total of 1170 private hospitals on the island of Java, comprising hospital types A to D. The differences between hospital types A through D are based on the range of medical subspecialties and treatments they offer, with type A providing the most comprehensive services and type D offering the least. For example, Type A hospitals must have facilities and capabilities for medical services, including at least 4 basic medical specialists, 5 supporting medical specialists, 12 other medical specialists, and 13 medical subspecialists. Type B hospitals must have at least 4 basic specialists, 4 supporting medical specialists, 8 other specialists, and 2 basic subspecialists. Type C hospitals are required to provide at least 4 basic medical specialists and 4 supporting medical specialists. Type D hospitals offer general medical services and emergency care. Each type of hospital must have a minimum number of beds and human resources with the number of medical personnel as stated in the regulation of the Minister of Health Regulation No. 3 of 2020. Directors or procurement managers in charge of purchasing goods and services in private hospitals were chosen as respondents due to their pivotal role in procurement decisions for healthcare equipment. In addition, we choose sample which had been using the same medical equipment supplier for at least one year. The aim was to assess the perceived value from business consumers who had been in partnership for a year.

This study employs probability sampling because the population size in this study is already known (the number of private hospitals on Java Island). Furthermore, the sampling technique used is stratified proportionate random sampling, aimed at studying the preferences of business consumers in the healthcare industry market. Proportional stratified random sampling involves taking random samples from stratified groups in proportion to the population. The groups are categorized by the type of hospital, and random sampling is then conducted within each group. This sampling design was chosen for its efficiency in understanding consumer buying patterns (Sekaran & Bougie, 2016). The primary benefit of stratified proportionate random sampling is that it ensures representation across different subgroups, leading to more accurate and reliable results.

The population size was set at 1170 private hospitals on the island of Java based on the data from Ministry of Health Republic Indonesia (2022) The sample size was determined using the Slovin method. Researchers calculated the sample size with an error tolerance of 5%-10% (Dania, Xing, & Amer, 2019; Mannan, Nurpratama, Shuhidan, & Masrek, 2023; Mashali, Elbeltagi, Motawa, & Elshikh, 2023), and with an error margin of 6%, resulting in a sample size of 224 private hospitals for this study.
4. Result

4.1. Descriptive Analysis

The survey reveals that 61.5% of the respondents are male, while the remaining 38.5% are female. The majority of respondents hold a Bachelor's (S1) or Diploma (D4) degree, accounting for 49.1% of the total. This is followed by respondents with a Master's (S2) degree, comprising 39.8% of the respondents. These two educational levels significantly dominate over others. A majority of respondents have monthly expenditures exceeding Rp15,000,000, accounting for 57.1% of the respondents.

From the characteristics of the respondents, it can be observed that the majority of decision-makers in private hospitals are aged between 40 and 50 years old (comprising 54% of the total accepted respondents). This age group typically represents individuals with extensive experience in evaluating and analyzing investments that private hospitals may make towards products and partnerships. They also possess a deep understanding of the potential risks involved, particularly when the hospital has established partnerships with specific suppliers.

In terms of brand image, the highest average score/mean is obtained for BIM02, which measures familiarity with the product, with a mean of 4.51. This indicator includes the statement "The healthcare equipment products we selected have a well-known name." This suggests that the recognition of a product brand is a key factor in shaping brand image. For this indicator, the majority of respondents, 52.21%, selected the highest score on the scale. Conversely, the indicator with the lowest average score/mean is BIM03, related to measuring product excellence, with a mean of 4.23.

Regarding perceived value, the highest mean is obtained for PVA01, which represents functional value, with an average score/mean of 4.22. This indicator includes the statement "The functionality of the product I receive aligns with what we paid for." This indicates that the functionality of a product plays a crucial role in providing perceived value to consumers, where the function and value of the product are commensurate or exceed the price paid.

Among the four statements proposed for the switching cost variable, the highest average score/mean is found for item SWC03, with the statement "Switching distributors can incur costs in terms of doing business with a new healthcare equipment supplier," scoring a mean of 3.4. Conversely, the lowest score is obtained for item SWC04, with the statement "Switching to a new healthcare equipment distributor can result in the cost of losing the relationship with the previous supplier."

4.2. Validity and Reliability Test

The validity test confirms that all indicators are valid, with factor loadings exceeding 0.6, signifying the absence of correlation among indicators (refer to Table 1). Additionally, the test demonstrates that the square root of the Average Variance Extracted (AVE) between each pair of factors surpasses the estimated correlation between factors, thereby affirming discriminant validity (Hair et al., 2017) (refer to Table 2).

As depicted in Table 1, all latent variables surpass the minimum requirements for reliability testing. The results of the reliability test for these five variables indicate the reliability of the instruments used for each variable. This finding suggests that all items in the instrument utilized in this study are consistent and suitable for measuring the same research model across different settings, indicated by the values of Cronbach's Alpha, CR, and AVE surpassing the recommended thresholds. Furthermore, a test for multicollinearity using the VIF test was conducted (refer to Table 3). The VIF test results indicate that all indicators have VIF values below 5, signifying the absence of multicollinearity issues.
Table 1. Validity and Reliability Test of the Latent Variables and Items.

<table>
<thead>
<tr>
<th>Latent Variable</th>
<th>Items</th>
<th>Factor Loading</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Brand Image</strong></td>
<td>BIM01: The healthcare equipment products we selected have a good reputation.</td>
<td>0.913</td>
</tr>
<tr>
<td></td>
<td>BIM02: The healthcare equipment products we selected have a well-known name.</td>
<td>0.773</td>
</tr>
<tr>
<td></td>
<td>BIM03: I use superior products.</td>
<td>0.785</td>
</tr>
<tr>
<td></td>
<td>BIM04: The brand of the product I use is reliable.</td>
<td>0.867</td>
</tr>
<tr>
<td><strong>Perceived Value</strong></td>
<td>PVA01: The functionality of the product I receive aligns with what we paid for.</td>
<td>0.823</td>
</tr>
<tr>
<td></td>
<td>PVA02: The healthcare equipment distributor provides a reasonable price for the product</td>
<td>0.756</td>
</tr>
<tr>
<td></td>
<td>PVA03: I am satisfied with the product</td>
<td>0.813</td>
</tr>
<tr>
<td></td>
<td>PVA04: The brand of the product we use aligns with our values</td>
<td>0.886</td>
</tr>
<tr>
<td></td>
<td>PVA05: The healthcare equipment distributor supports our needs.</td>
<td>0.816</td>
</tr>
<tr>
<td><strong>Loyalty</strong></td>
<td>LYL01: I am loyal to using trusted brands.</td>
<td>0.792</td>
</tr>
<tr>
<td></td>
<td>LYL02: I will purchase from my preferred healthcare equipment distributor for years to come.</td>
<td>0.798</td>
</tr>
<tr>
<td></td>
<td>LYL03: I will recommend my preferred brand to colleagues.</td>
<td>0.900</td>
</tr>
<tr>
<td></td>
<td>LYL04: I will recommend my preferred healthcare equipment distributor to colleagues.</td>
<td>0.888</td>
</tr>
<tr>
<td><strong>Switching Cost</strong></td>
<td>SWC01: Switching to a new distributor will consume a lot of energy.</td>
<td>0.897</td>
</tr>
<tr>
<td></td>
<td>SWC02: Switching to a new product will consume a lot of time.</td>
<td>0.867</td>
</tr>
<tr>
<td></td>
<td>SWC03: Switching distributors can incur costs in terms of doing business with a new healthcare equipment supplier.</td>
<td>0.784</td>
</tr>
<tr>
<td></td>
<td>SWC04: Switching to a new healthcare equipment distributor can result in the cost of losing the relationship with the previous supplier.</td>
<td>0.791</td>
</tr>
</tbody>
</table>

Table 2. Result of Discriminant Validity Test.

<table>
<thead>
<tr>
<th></th>
<th>BIM</th>
<th>LYL</th>
<th>PVA</th>
<th>SWC</th>
<th>SWC*BIM</th>
</tr>
</thead>
<tbody>
<tr>
<td>BIM</td>
<td>0.837</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>LYL</td>
<td>0.534</td>
<td>0.846</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PVA</td>
<td>0.717</td>
<td>0.551</td>
<td>0.820</td>
<td></td>
<td></td>
</tr>
<tr>
<td>SWC</td>
<td>0.238</td>
<td>0.280</td>
<td>0.182</td>
<td>0.836</td>
<td></td>
</tr>
<tr>
<td>SWC*BIM</td>
<td>0.116</td>
<td>0.139</td>
<td>0.209</td>
<td>0.051</td>
<td>1.000</td>
</tr>
</tbody>
</table>

Table 3. Result of VIF Test.

<table>
<thead>
<tr>
<th>Dependent Variable</th>
<th>Loyalty (LYL)</th>
<th>Perceived (PVA)</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Independent Variable</td>
<td>Brand Image (BIM)</td>
<td>2.113</td>
<td>1.000</td>
</tr>
<tr>
<td></td>
<td>Perceived Value (PVA)</td>
<td>2.126</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Switching Cost (SWC)</td>
<td>1.062</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Moderator (SWC*BIM)</td>
<td>1.049</td>
<td></td>
</tr>
</tbody>
</table>

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4.3. Estimation Results

The direct path analysis using the Partial Least Squares Structural Equation Modeling (PLS-SEM) method reveals significant relationships between brand image, customer perceived value, and customer loyalty. Firstly, brand image positively and directly impacts customer loyalty, with a standardized coefficient (β) of 0.254 (p<0.01), indicating a moderate effect. This means a stronger brand image moderately increases customer loyalty. Additionally, brand image has a strong positive and direct impact on customer perceived value (β=0.717, p<0.01). This large effect size shows that a better brand image greatly enhances perceived value. Moreover, customer perceived value significantly influences customer loyalty (β=0.333, p<0.01), indicating that higher perceived value leads to greater loyalty. These findings suggest that while brand image is crucial for loyalty formation, the perceived value of the product also plays a significant role in shaping loyalty in the B2B healthcare equipment market. Besides that, these results align with our hypothesis (refer to Table 4).

Moreover, the results of the indirect path analysis or mediation analysis indicate that the influence of brand image on loyalty through perceived value obtains partially mediates the relationship between brand image and loyalty (β=0.239, p<0.01). As both the direct and indirect effects between brand image and loyalty are significant, it suggests that perceived value serves as a partial mediator between the brand image-loyalty relationship. This suggests that while the perceived value of the product by customers can partially explain the mechanism through which brand image affects loyalty, there remains a residual direct effect even after introducing the mediator of perceived value. These results highlight that in the healthcare diagnostic equipment market, loyalty is not solely formed by the embedded value of the product, different from other general product-based markets.

Table 4. Direct, Indirect, and Moderating Effect from Path Analysis.

<table>
<thead>
<tr>
<th>Path</th>
<th>Effect</th>
<th>Coefficient</th>
<th>SD</th>
<th>t-stat</th>
<th>P-Val</th>
</tr>
</thead>
<tbody>
<tr>
<td>H1: Brand Image → Loyalty</td>
<td>Direct</td>
<td>0.25</td>
<td>0.08</td>
<td>3.24</td>
<td>0.001</td>
</tr>
<tr>
<td>H2: Brand Image → Perceived Value</td>
<td>Direct</td>
<td>0.72</td>
<td>0.03</td>
<td>26.09</td>
<td>0.000</td>
</tr>
<tr>
<td>H3: Perceived Value → Loyalty</td>
<td>Direct</td>
<td>0.33</td>
<td>0.10</td>
<td>3.43</td>
<td>0.000</td>
</tr>
<tr>
<td>H4: Brand Image → Perceived Value → Loyalty</td>
<td>Indirect (mediating)</td>
<td>0.24</td>
<td>0.07</td>
<td>3.40</td>
<td>0.000</td>
</tr>
<tr>
<td>H5: Switching Cost*Brand Image → Loyalty</td>
<td>Moderating</td>
<td>0.03</td>
<td>0.05</td>
<td>0.63</td>
<td>0.265</td>
</tr>
</tbody>
</table>

The findings from this direct and indirect analysis align with studies conducted in other healthcare sectors, although not specifically in the context of the healthcare equipment market. For instance, research conducted in Thailand on consumer loyalty in personal healthcare services for hypertension patients indicates that brand image positively influences consumer loyalty (Charukitpipat, 2024). The study argues that brand marketers and service providers should focus on stimulating positive word-of-mouth promotion and shaping brand image through service promotion and advertising to create brand loyalty and equity in personal healthcare services. Additionally, research by Paradilla et al. (2022) examines the influence of brand image on general patient loyalty at Makassar City Hospital. The findings indicate that brand image has both direct and indirect impacts on loyalty through patient satisfaction. Activities aimed at improving brand image subsequently increase patient satisfaction. A study by Lin and Yin (2022) explores the effects and influence paths of service quality, brand image, perceived value, and service satisfaction on outpatients’ loyalty to China’s private dental clinics. Using path analysis, the study indicates that perceived value, perceived quality, and expected quality have direct effects on patient satisfaction and indirect effects on patient loyalty. These factors influence
patient loyalty through patient satisfaction. Overall, studies in various healthcare sectors consistently show that brand image is both directly and indirectly foster consumer loyalty, highlighting the universal importance this factor across different healthcare contexts.

Meanwhile, studies in other sectors also shows similar results. In the online electronics sales sector in Spain, research conducted on several e-marketplaces revealed that perceived value positively reinforces the relationship between brand image and customer loyalty (Janita & Miranda, 2013). Similarly, research in the transportation industry indicates that brand image plays a primary role in the service industry and significantly influences consumers' decisions to engage in repeat transactions with the same service provider. Consumers develop a perceived value from the brand image and evaluate the trade-off between the costs incurred and the benefits received. Consequently, consumers form their own value perceptions and memories, strengthening the relationship between brand image and the intention of consumers to engage in repeat transactions (Hasby et al., 2018).

Another noteworthy finding pertains to the moderating variable, switching cost, which exhibits a non-significant effect on the relationship between brand image and loyalty, contrary to our hypothesis and previous study findings (refer to Table 4). This result suggests that in the healthcare equipment market, switching costs such as the cost to find a new distributor in terms of time, money, and emotions do not alter the strength of loyalty for the supplier. This can be interpreted as hospitals not being loyal to a particular brand only; they may opt for other products and brands even if the brand image of a product used can be considered quite good.

The competitive nature of the market may contribute to relatively low switching costs, as hospitals appear to easily switch their suppliers. The possibility of business consumers switching to other brands may be due to the emergence of substitute products that resemble the ones used but offer better features and more competitive prices. Over time, manufacturers of healthcare equipment will continually innovate and improve the quality of their products, resulting in the introduction of new products periodically and showcasing the latest technology and features to facilitate user access. There are many considerations involved in the use of products from available brands in the market, including product reputation, well-known brands, product excellence, and trust in the product itself.

The increasing number of product brands in this industry, which was initially dominated by major brands from Europe or America, is now shifting towards substitute products manufactured in countries such as China, Korea, Japan, and even India. These substitute products offer similar technology and provide ease of use along with more competitive prices. This provides private hospitals with greater flexibility in choosing healthcare equipment products. This is also evident in the survey results, where hospitals tend to assign low scores to the incurred costs due to switching, whether financial losses or relationship losses.

5. Conclusions

This study sheds light on the intricate nature of loyalty formation in the B2B healthcare equipment market in Indonesia. By examining the relationships between brand image, customer perceived value, switching costs, and loyalty, the authors provide valuable insights for both researchers and practitioners. The findings highlight the importance of building a strong brand image and delivering products with high perceived value to foster customer loyalty. Interestingly, the non-significant moderating effect of switching costs suggests that in this market, loyalty is not solely driven by the perceived costs of changing suppliers, but rather by the overall value proposition and relational factors.

The study contributes to the B2B marketing literature by demonstrating the unique dynamics of loyalty formation in a market characterized by minimal product differentiation. It extends previous research by incorporating customer perceived value as a mediator and switching costs as a moderator in the brand image-loyalty relationship. Theoretically, this study builds on the loyalty theory developed
by Dick and Basu (1994), which posits that consumer loyalty is influenced by cognitive trust, emotional attachment, and conative expectations and costs associated with switching suppliers. This research also found that brand image affects loyalty directly and indirectly through perceived value, where customers recognize the functional, emotional, social, and economic benefits of the products, leading to positive perceptions and continued usage. The study also aligns closely with the perceived value theory in a B2B context, emphasizing that a strong brand reputation and the creation of perceived value both contribute significantly to customer retention.

The findings have practical implications for healthcare equipment suppliers. They highlight the importance of both building strong brand image and delivering products that offer high perceived value to customers. Managers should focus on enhancing product reputation, familiarity, excellence, and trustworthiness to improve brand image. Additionally, they should emphasize the functional, emotional, and relational benefits of their products to increase customer value creation and, consequently, retain customers in a competitive market. Thus, loyalty can be improved through both the direct and indirect effects of brand image. In addition, managers should focus on strengthening the overall value proposition and relational factors rather than relying on the belief that customers cannot easily switch suppliers due to the presence of switching costs. They should not assume that customers will stay loyal simply because it is hard to find new suppliers or because of the fear of losing a long-term relationship.

However, the study is not without limitations. The focus on private hospitals in Java may limit the generalizability of the findings to other regions or types of healthcare institutions. Moreover, the study focuses on a limited set of variables. Future research could address this by expanding the geographical scope and including public hospitals in the sample. They could also explore additional factors that may influence loyalty in the B2B healthcare equipment market, such as service quality, innovation, or relationship duration. Additionally, conducting longitudinal studies could provide insights into the dynamics of loyalty formation over time. Conducting qualitative studies could also complement this research by providing a deeper understanding of the underlying mechanisms and processes of loyalty formation in this context.

In conclusion, this study offers a valuable contribution to the understanding of loyalty dynamics in the B2B healthcare equipment market and provides a foundation for future research in this area. By addressing the identified limitations and exploring additional variables and contexts, researchers can further advance knowledge in this field and provide more comprehensive insights for practitioners.

References


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