

The Influence of Social Media Marketing and Price Perception on Hospital Brand Image and Its Influence on Hospital Choice Intention at XYZ Orthopedic Hospital in Jakarta

Johan Qomarasandhi

Faculty of Medicine, Universitas Pelita Harapan, Indonesia

Email: johan.qomarasandhi@gmail.com

ABSTRACT

XYZ Orthopedic Hospital in Jakarta faces declining patient acquisition and challenges in converting clinic visits into elective surgeries, which are its primary revenue streams. This study explores the effects of social media marketing and price perception as one of the antecedents to hospital brand image and their impact on hospital choice intention, with health literacy as moderating variables. A cross-sectional study was conducted with 134 respondents recruited from outpatient clinics at XYZ Orthopedic Hospital. Data were collected using a structured questionnaire and analyzed through Structural Equation Modelling (SEM). Variables measured included Word of Mouth (WoM), Hospital Social Media, Patient Review, Hospital Advertisement, Price Perception, Surgeon Reputation, Hospital Brand Image, Health Literacy, and Hospital Choice Intention. Word of Mouth, Surgeon Reputation, and Price Perception have significant impact toward Hospital Brand Image while Hospital brand image itself does not have an impact towards Hospital Choice Intention unlike Surgeon Reputation ($R = 0.440$, $p < 0.05$). The Overall model has an R^2 of 0.690. Importance Performance Map Analysis shows that without Hospital Brand Image, Price Perception of this hospital needs significant improvement and very important, but when accounts for the hospital brand image, the price perception becomes less important. Enhancing word of mouth, price competitiveness and emphasizing surgeon reputation are critical for improving hospital brand image. With a stronger hospital brand image, one can price more freely towards patients.

KEYWORDS



Price Perception; Hospital Brand Image; Hospital Choice Intention; Surgeon Reputation; Health Literacy

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INTRODUCTION

XYZ Orthopedic Hospital in Jakarta is one of the health institutions that provides specialized services in the field of orthopedics, including various surgical and non-surgical procedures. As a hospital that prioritizes specialist services, XYZ Orthopedic Hospital is faced with challenges due to the increasingly fierce competition in the healthcare industry. One of the main challenges faced by the hospital is the declining number of new patients, as well as the difficulty in converting clinic visits into elective surgeries, which play an important role in the hospital's revenue (Alalwan et al., 2022; Bruhn et al., 2012; Chandra et al., 2017; Fang & Singh, 2014). In an interview with the hospital's president director, it was revealed that the hospital's main problem is the lack of activity on social media and the poor conversion rate of polyclinic visits into elective procedures, which are the main revenue streams of the hospital. The Head of Marketing also stated that the marketing process using social media has not been effective, preventing the hospital from promoting a positive image, which is a major factor in attracting potential patients. An interview was also conducted with one of the surgeons, who pointed out that

the high cost at the private hospital is one of the key reasons it is difficult for polyclinic patients to undergo surgical procedures (Verma et al., 2023; Wang et al., 2023; Wu, 2011; Xue et al., 2023; Zhao et al., 2023).

The decline in the number of patients can be caused by several factors, including a lack of effective promotion, uncompetitive price perception, and a less strong brand image of the hospital in the eyes of the public. According to Oliver (2010), *brand image* is a perception formed in the minds of consumers based on their interactions and experiences with a brand. In the healthcare sector, the hospital brand image is significantly influenced by the quality of service, physician reputation, patient reviews, and various forms of communication, including *Word of Mouth* and social media (Andaleeb, 2001; Lee & Kim, 2017).

In recent years, social media has become one of the most effective marketing tools for improving the brand image of hospitals. Platforms such as Instagram, Facebook, and Twitter allow hospitals to connect with patients directly, provide information about services, and build awareness and trust in the hospital's brand (Kaplan & Haenlein, 2010). At XYZ Orthopedic Special Hospital, the use of social media is expected to help increase engagement and strengthen the hospital's brand image, which is ultimately expected to increase patients' intention to choose this hospital (Gholami et al., 2023; Kim et al., 2023; Kotler & Keller, 2012; Lu et al., 2013; Mehta & Sharma, 2023; Nutbeam et al., 2023; Schivinski & Dabrowski, 2016).

In addition to social media, *price perception* also plays an important role in a patient's decision to choose a hospital. Price perception is how prospective patients view the cost of services offered by hospitals, whether they feel the cost is justified by the quality they will receive (Zeithaml, 1988). Research by Tohid et al. (2017) found that competitive price perceptions can increase patients' interest in using hospital services, especially in the context of private hospitals. Thus, managing price perception effectively is essential for attracting new patients and retaining existing ones.

Moreover, the reputation of the surgeon is a key factor in shaping the hospital's image. Patients tend to trust hospitals with reputable and experienced doctors, especially in orthopedic surgical procedures (Richter & Muhlestein, 2017). At XYZ Orthopedic Hospital, the surgeon's reputation is expected to strengthen the brand image and influence patients' intention to choose the hospital. Therefore, this study will also explore how the reputation of surgeons can moderate the relationship between hospital brand image and patient intentions in choosing a hospital.

On the other hand, *health literacy* also has a significant impact on patients' decisions when choosing healthcare services. Health literacy includes the ability of individuals to understand health information and make informed decisions regarding their healthcare (Berkman et al., 2011). Patients with high health literacy tend to be more active in seeking information about health services and more selective in choosing hospitals. High health literacy can influence the way patients assess the brand image of a hospital and affect their decision to choose services at the hospital (Davis et al., 2002).

Previous studies have extensively explored the factors influencing patient decisions in choosing healthcare services, with significant focus on brand image and price perception. For

example, Andaleeb (2001) and Lee & Kim (2017) highlight the impact of hospital brand image in shaping patients' preferences. Their research primarily emphasizes the role of communication and patient reviews in fostering a positive brand image. However, this body of research does not adequately address the role of social media marketing as a dynamic tool in modernizing and influencing brand perception in hospitals. Additionally, the influence of surgeons' reputation and health literacy, particularly as moderating factors, has been overlooked. This gap is filled by the current study, which integrates social media marketing and explores how it influences brand image in the context of XYZ Orthopedic Hospital. It also introduces the moderating effects of surgeon reputation and health literacy, which have not been sufficiently explored in previous studies like those of Richter & Muhlestein (2017) or Tohid et al. (2017), who discussed the importance of competitive pricing and the surgeon's reputation, but did not explore how these factors interact with brand image and patient intent in the specific context of orthopedic care.

Based on this background, this study will analyze how marketing through social media and price perception affects the brand image of XYZ Orthopedic Hospital, as well as how the brand image affects patients' intention in choosing a hospital. This study will also examine the role of moderation of surgeon reputation and health literacy in strengthening the relationship between hospital brand image and patient intent.

The purpose of this study is to analyze the influence of marketing through social media on the brand image of XYZ Orthopedic Hospital, as well as examine how price perception affects the brand image of the hospital. In addition, this study also aims to analyze the influence of brand image on patients' intentions in choosing XYZ Orthopedic Hospital. Furthermore, this study seeks to examine the role of surgeons' reputation moderation on the relationship between brand image and patient intentions in choosing a hospital, as well as test the role of health literacy moderation in the same relationship.

This research is expected to provide benefits both practically and theoretically. Practically, the results of this study are expected to provide strategic recommendations to the management of XYZ Orthopedic Hospital, especially related to marketing management through social media and price perception in an effort to improve brand image and attract more patients. In addition, the findings can also help hospital management understand the importance of surgeons' reputation and patients' health literacy levels in influencing their decisions when choosing health services. From a theoretical perspective, this research is expected to enrich the academic literature on the influence of marketing through social media and price perception on hospital brand image, as well as the relationship between brand image and patient intention in choosing a hospital. Furthermore, this research is also expected to contribute to the development of theories related to the role of reputation moderation of surgeons and health literacy in shaping consumer behavior in the healthcare sector.

METHOD

This study examines the influence of various factors on the intention to choose XYZ Orthopedic Hospital in Jakarta, with independent variables including *Word of Mouth*

Communication, Hospital Social Media, Patient Review, Hospital Advertisement, Price Perception, and Surgeon Reputation. Hospital Brand Image acts as a mediating variable, while *Health Literacy* acts as a moderating variable on the relationship between *Hospital Brand Image* and *Hospital Choice Intention* as a dependent variable. This study uses a quantitative approach with a cross-sectional survey design and data collection through a Google Form questionnaire. The target population consists of non-BPJS orthopedic outpatients from October-November 2024, and the sample was purposively determined to include 123 individuals based on the results of G*Power calculations. Variable measurements were carried out using a 5-point Likert scale and were tested through initial validity and reliability tests on 40 respondents. Data analysis was conducted using SEM with SmartPLS 3.3, including outer model tests (reliability, convergent and discriminant validity) and inner model tests (collinearity, path coefficient, and R² determination coefficients).

The results of the instrument test showed that all variables had high reliability, with Cronbach's alpha and composite reliability values > 0.7, as well as convergent validity with AVE > 0.5. Discriminant validity was also met based on the HTMT criteria, ensuring that each construct could be distinguished from the others. Nine key variables were tested, including *Hospital Advertisement* (AVE = 0.787), *Hospital Brand Image* (AVE = 0.854), *Health Literacy* (AVE = 0.881), and *Word of Mouth* (AVE = 0.735). This research contributes to the academic understanding and practice of hospital management, particularly in building brand image and maximizing physician reputation and health literacy to increase patient intention in choosing a hospital.

RESULTS AND DISCUSSION

Respondent Characteristics

Analysis of respondents' characteristics showed adequate qualifications for this study. Of the 143 respondents who participated, the distribution of education showed the dominance of S1 graduates by 85% and S2 by 15%, with an average work experience of 12 years in the range of 5-20 years. The composition of respondents' positions reflects a good representation of various levels of management in the smelter industry, including project managers (25%), site engineers (20%), quantity surveyors (18%), planning consultants (15%), contractors (12%), and other positions (10%).

The geographical distribution of respondents covers the main smelter industrial area in Southeast Sulawesi, with concentrations in Kendari (45%), Kolaka (30%), and surrounding areas (25%). This diversity of backgrounds provides a comprehensive perspective in assessing the implementation of green building in smelter buildings, considering that respondents have first-hand experience in industrial construction projects and understand the complexities of nickel smelter construction.

Evaluation of Measurement Models (Outer Model)

Evaluation of the outer model is a critical stage in the analysis of SEM-PLS to ensure the validity and reliability of the research instrument. The results of the evaluation showed that all constructs met the required criteria with very satisfactory values.

Table 1. Evaluation of the Reliability of Research Constructs

Construct	Cronbach's Alpha	rho_A	Composite Reliability	AVE	Interpretation
Green Cost (X2)	0,9936	0,9939	0,9937	0,6518	Highly Reliable
Smelter (X1)	0,9931	0,9933	0,9933	0,6799	Highly Reliable
Cost Performance (Y)	0,9213	0,9240	0,9373	0,6822	Reliable
ZEB (X3)	0,8240	0,8255	0,8954	0,7408	Reliable

Source: processed data

Cronbach's Alpha values for all constructs are in the range of 0.8240-0.9936, indicating excellent internal consistency. Construct Green Cost (X2) has the highest reliability with $\alpha=0.9936$, followed by Smelter (X1) with $\alpha=0.9931$. This indicates that the indicators in each construct consistently measure the same concept.

The composite reliability of all constructs shows values above 0.8 with a range of 0.8954-0.9937, indicating an excellent level of combined reliability. The Average Variance Extracted (AVE) of all constructs was above the minimum value of 0.5 with a range of 0.6191-0.8633, meeting the criteria of convergent validity required by Hair et al. (2019)

Table 2. Loading Factor Highest Indicator per Construct

Construct	Highest Indicators	Loading Factor	T-Statistic
Smelter (X1)	Implementation Quality	0,8945	145,678
Green Cost (X2)	Ecological Risks	0,9700	163,159
ZEB (X3)	Site Selection	0,9551	196,357
Cost Performance (Y)	Internal Cost Efficiency	0,8832	132,445

Source: processed data

The loading factor for 213 indicators showed values above 0.5, with the majority reaching values above 0.7. The indicators with the highest loading factors are "Ecological risks and opportunities" (0.9700), "Site selection" (0.9551), and "Energy monitoring" (0.9647), showing a very strong representation of the latent construct.

Evaluation of Structural Models (Inner Model)

Internal evaluation of the model shows excellent predictive power of the model, confirming that the research model is able to accurately explain the observed phenomenon.

Table 3. R² Evaluation of Structural Models

Construct	R ²	R ² Adjusted	Predictive Power Category	Interpretation
Green Cost (X2)	0,9804	0,9803	Excellent	98.03% variability explained
Cost Performance (Y)	0,9276	0,9261	Excellent	92.61% variability explained
ZEB (X3)	0,8742	0,8735	Strong	87.35% variability explained

Source: processed data

The R² value for Cost Performance (Y) of 0.9276 with adjusted R²=0.9261 indicates that 92.61% of the variability of cost performance can be explained by independent variables in the

model. This value shows excellent predictive power according to the criteria of Hair et al. (2019) which categorize the value of $R^2 > 0.75$ as a strong model.

The Green Cost construct (X2) has the highest R^2 (0.9804) with adjusted $R^2=0.9803$, indicating that the characteristics of the Smelter and the implementation of ZEB are able to explain the 98.03% variability of the Green Cost. These findings confirm that the characteristics of the smelter and the implementation of ZEB are the main determinants in determining the green cost of the smelter construction project.

Path Coefficient and Significance Analysis

Path coefficient analysis revealed a significant relationship between all the main variables with a T-statistic value of >1.96 and a p-value of <0.05 , confirming the validity of the research hypothesis.

Table 4. Path Coefficient and Significance of Structural Relationships

Relationship	Path Coefficient	T-Statistic	P-Value	Results	Effect Size
Smelter → Green Cost	0,823	156,742	0,000	Accepted	Large
Green Cost → Cost Performance	0,987	465,935	0,000	Accepted	Large
Green Cost → ZEB	0,891	198,634	0,000	Accepted	Large
ZEB → Cost Performance	0,745	89,456	0,000	Accepted	Medium

Source: processed data

The strongest relationship was found between Green Cost and Cost Performance with a path coefficient of 0.987 and a T-statistic of 465.935. This value indicates that the implementation of the green building concept has a very strong and positive influence on cost performance, supporting the argument that investment in green building provides significant returns in the long run.

The path coefficient of the Smelter → Green Cost (0.823) with a T-statistic of 156.742 shows that the characteristics and requirements of the smelter have a very significant influence on the green cost. The relationship between Green Cost → ZEB (0.891) with T-statistic 198,634 shows that the effective implementation of green cost encourages the adoption of Zero Energy Building technology.

Identify Influencing Factors

Based on the analysis of outer loading T-statistic with a threshold of >1.96 , this study succeeded in identifying the 10 most influential factors in improving the performance of green costs in BREEAM-based smelter buildings with ZEB.

Table 5. The Ten Most Influential Factors in Green Cost Optimization

Ranking	Factor	Code	T-Statistic	Loading Factor	Category BREEAM
1	Ecological risks and opportunities	X2.8.2	163,1589	0,9700	Land Use & Ecology
2	Ecological change and enhancement	X2.8.4	151,2159	0,9679	Land Use & Ecology
3	Managing impacts on ecology	X2.7.4	139,9561	0,9655	Land Use & Ecology

Ranking	Factor	Code	T-Statistic	Loading Factor	Category BREEAM
4	Energy monitoring	X2.3.2	175,1639	0,9647	Energy
5	Sustainable transport measures	X2.4.1	175,6288	0,9634	Transport
6	Energy efficient equipment	X2.3.8	155,2954	0,9607	Energy
7	Low carbon design	X2.3.4	152,8641	0,9600	Energy
8	Environmental impacts - LCA	X2.5.1	152,7095	0,9580	Materials
9	Road transport	X2.4.3	129,3433	0,9573	Transport
10	Site selection	X3.10.4	196,3569	0,9551	ZEB Implementation

Source: processed data

The dominance of ecological and energy factors (70% of the top 10) indicates the importance of environmental aspects in green cost optimization. "Ecological risks and opportunities" as the top factor with T-statistic 163.1589 emphasizing the critical environmental impact assessment in the construction of green smelters. This is in line with Indonesia's increasingly stringent environmental regulations and global commitment to sustainable development.

The "Energy monitoring" factor occupies the fourth position with a T-statistic of 175.1639, showing the importance of a real-time energy monitoring system in optimizing green cost performance. The implementation of an effective monitoring system allows the identification of energy consumption patterns, inefficiency detection, and continuous optimization of energy use.

Implementation of BREEAM with ZEB: A Comprehensive Cost-Benefit Analysis

The implementation of the BREEAM concept with the ZEB method in the smelter building showed significant variations in cost efficiency based on the selected rating target. Cost-benefit analysis reveals a complex trade-off between initial investment and long-term operational savings.

Table 6. Cost Efficiency Analysis Based on BREEAM Rating with ZEB

Rating BREEAM	Initial Cost (IDR)	Green Cost with ZEB (IDR)	Savings (Rp)	Efficiency (%)	Payback Period	Annual ROI (%)
Pass	18.127.431.955	16.684.443.155	1.442.988.800	7,96%	8-10 years	8,2%
Good	24.517.431.955	22.990.385.555	1.527.046.400	6,23%	10-12 years	6,8%
Very Good	32.247.306.955	30.552.145.355	1.695.161.600	5,26%	12-15 years	5,9%
Excellent	38.323.362.455	36.576.904.455	1.746.458.000	4,56%	15-18 years old	4,8%
Outstanding	42.359.942.455	40.381.560.455	1.978.382.000	4,67%	18-22 years old	4,2%

Source: processed data

The PASS rating shows the highest efficiency (7.96%) with savings of IDR 1.44 billion and the fastest payback period (8-10 years). The high efficiency of the PASS rating is due to the

focus on the cost-effective implementation of ZEB technology without complex additional requirements. Basic technologies such as solar panel systems, energy-efficient lighting, and basic building automation systems provide optimal return on investment with an annual ROI of 8.2%.

In contrast, the OUTSTANDING rating shows the lowest efficiency (4.67%) despite the highest absolute savings (IDR 1.98 billion) with the longest payback period (18-22 years). This phenomenon occurs because to achieve an OUTSTANDING rating, investment in cutting-edge technology and integrated systems is required which has a very high initial cost. Technologies such as advanced building management systems, high-performance building envelopes, and renewable energy storage systems require substantial investment but provide an annual ROI of 4.2%.

Analysis of Green Cost Structure with ZEB Implementation

The cost structure of the implementation of ZEB at the smelter shows a significantly different distribution compared to conventional construction, reflecting the complexity of the integrated green technology.

Table 7. Green Cost Structure with ZEB Implementation				
Cost Component	Percentage (%)	Description	Impact on Efficiency	
Material Cost	35-40%	High-performance materials, sustainable materials	High impact - long-term durability	
Energy System Cost	25-30%	Solar panels, wind turbines, energy storage, BMS	Very high impact - core ZEB technology	
Technology Integration	15-20%	Building automation, smart systems, commissioning	Medium impact - operational efficiency	
Certification & Compliance	5-10%	BREEAM certification, energy audit, regulation	Low impact - mandatory requirement	
Contingency & Others	5-10%	Risk mitigation, additional features	Variable impact	

Source: processed data

The largest component is Material Cost (35-40%), where the use of environmentally friendly materials and high-performance building materials increases material costs but provides long-term durability and energy efficiency. Energy System Cost (25-30%) includes investments in renewable energy generation, energy storage, and building management systems that are at the core of ZEB technology.

Effect Size dan Predictive Relevance Analysis

The f^2 analysis reveals the effect size of the relationship between constructs, providing insight into the substantive strength of the influence of each variable.

Tabel 8. Effect Size (f^2) dan Predictive Relevance (Q^2)

Relationship	f^2	Category: Effect Size	Q^2	Predictive Relevance
Smelter → Green Cost	11,510	Large	0,671	Strong
Green Cost → ZEB	17,184	Large	0,628	Strong
Green Cost → Cost Performance	0,105	Small to Medium	0,620	Strong
ZEB → Cost Performance	0,089	Small	0,673	Strong

Source: processed data

The relationship between Smelter → Green Cost has $f^2=11.510$ (large effect), indicating that the characteristics of the smelter have a very large substantive influence on green cost. The Green Cost → ZEB shows $f^2=17.184$ (large effect), confirming that the implementation of green cost effectively encourages the adoption of ZEB technology. The Q^2 values of all endogenous constructs >0 with a range of 0.620-0.673, confirm the excellent predictive relevance of the model. This shows that the model not only has high explanatory power but also excellent predictive capabilities for practical applications.

Cross-Loading Validation and Discriminant Validity

Discriminant validity testing using Fornell-Larcker criteria and cross-loading analysis showed that all constructs had adequate discriminant validity. The square root of each construct is greater than the correlation of that construct with the other constructs, indicating that each construct has unique and non-redundant characteristics.

Theoretical and Practical Implications

The research findings make a significant theoretical contribution by developing the BREEAM-ZEB integration framework for the smelter industry, extending the application of green building theory from the commercial sector to heavy industry. The model developed shows that sustainability principles can be effectively applied to industries with energy-intensive characteristics such as nickel smelters.

Practically, ten influential factors identified are a priority guide for the implementation of green building in smelter projects. The dominance of ecological and energy factors provides a clear roadmap for industry stakeholders to focus on environmental impact assessment, energy monitoring systems, and sustainable transport measures as the starting point for implementation.

The cost efficiency of 4.67-7.96% found, although more conservative than the USGBC's claim (8-9%) for commercial buildings, still shows a strong economic justification for the adoption of green buildings in the smelter industry. The absolute savings of IDR 1.44-1.98 billion per project provide a compelling business argument for investment in green technology.

Comparison with International Studies

The results of this study are consistent with the findings of international studies but show the necessary adaptations for the Indonesian industrial context. The study of Huang et al. (2018) in China showed a cost efficiency of 5-12% for green industrial buildings, while this study found

an efficiency of 4.67-7.96% for smelters. These differences reflect the higher complexity in the smelter industry and different economic conditions.

Limitations and Advanced Research

This study has geographical limitations focused on Southeast Sulawesi and a cross-sectional approach that does not allow analysis of changes in dynamics over time. Advanced research can use a longitudinal approach to understand the evolution of green cost performance in line with technological advancement and regulatory changes. Geographical expansion to other smelter industrial areas in Indonesia will also increase the generalizability of the findings.

CONCLUSION

To maximize XYZ *Orthopedic Specialty Hospital's* marketing effectiveness, improving *word of mouth*, addressing *price perceptions*, and highlighting surgeons' reputations are key strategies. Strengthening *word of mouth* can be achieved by encouraging positive patient testimonials and utilizing social media to share success stories and experiences. Addressing *price perceptions* involves transparent communication about the value of services, emphasizing quality care, expert surgeons, and outcomes to justify pricing. Additionally, showcasing surgeons' reputations by highlighting their expertise, qualifications, and successful patient outcomes will help build trust and credibility. This approach will not only enhance the hospital's *brand image* but also enable more flexible pricing strategies without negatively impacting patients' decision-making. Future research could explore the impact of specific social media strategies on patient acquisition, investigate how price sensitivity varies among patient demographics, and examine the role of surgeon-patient interaction in shaping the overall hospital *brand*.

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