
Antecedents of Competitive Advantage and Their Impact of Sustainable Business Performance: The Moderating Role of Entrepreneurial Orientation and Business Model Innovation

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Abstract

Competitive advantage is a key factor in ensuring sustainable business performance amid an increasingly dynamic and uncertain business environment. This study aims to develop a conceptual model that links strategic thinking and dynamic capability to competitive advantage. The analysis examines the role of transformational leadership as an intermediary factor, while entrepreneurial orientation and business model innovation function as reinforcing factors in this relationship. A quantitative approach using Structural Equation Model-Partial Least Squares (SEM-PLS) is applied to process data from various companies in the medical device industry. The findings indicated that strategic thinking and dynamic capability influence transformational leadership while also playing a crucial role in building competitive advantage. Additionally, transformational leadership strengthens business competitiveness and contributes to sustainable business performance. External factors such as entrepreneurial orientation and business model innovation further enhance this relationship, enabling organizations with greater flexibility and innovation to gain a stronger advantage in the competitive landscape. This study offers a more comprehensive understanding of the interrelationships among organizational strategy, leadership, and competitiveness within a complex theoretical framework. From a practical perspective, the findings provide valuable guidance for business leaders in formulating strategies, optimizing resource management, and designing business models that are more adaptable to market dynamics. Furthermore, this study provides new insights into how organizations can sustain and grow in an ever-evolving business environment through more adaptive and innovative strategy management. Understanding the interaction of these factors enables companies to better anticipate industry challenges and maintain long-term sustainable performance.

Keywords: competitive advantage, sustainable business performance, transformational leadership, entrepreneurial orientation, business model innovation

1. Introduction

In the era of globalization and increasing economic interdependence, market competition has intensified, compelling companies to continuously refine their competitive strategies. Businesses today face mounting challenges as consumers demand high-quality, cost-effective products and expect rapid responsiveness to market dynamics. The entry of new competitors with advanced digital capabilities and highly skilled human capital has further escalated market rivalry, necessitating innovative approaches to sustain market positions. The current global economic landscape remains highly uncertain. According to the World Bank, global economic growth is projected at 2.7% in 2024, with a cautionary note urging developing countries to adopt new strategies to stimulate investment and improve trade efficiency. Additional risks, such as geopolitical tensions and rising global interest rates, further exacerbate economic instability. Post-pandemic restructuring has also disrupted many industries, with numerous digital startups struggling to maintain their competitive edge.

Strategic thinking and dynamic capabilities are essential in enabling organizations to navigate turbulent markets. Firms must continuously reconfigure, integrate, and deploy resources effectively to sustain competitiveness (Parthasarathy et al., 2011). Transformational leadership fosters organizational agility, allowing firms to proactively adapt to changing market demands. Leaders with an entrepreneurial orientation—marked by innovation, risk-taking, and proactive decision-making—contribute significantly to long-term business sustainability (Weerawardena, 2013). Moreover, business model innovation (BMI) has emerged as a critical enabler of competitive advantage, allowing firms to realign operations in response to evolving industry landscapes.

Prior research has established that transformational leadership positively influences competitive advantage (Yangailoa, 2020), and that competitive advantage is strongly associated with business model innovation (Phangestu & Prameswari, 2020). However, limited studies have examined the integrated influence of these strategic variables on sustainable business performance.

While existing literature has addressed individual aspects of competitive advantage, leadership, and innovation, few studies have explored their interrelationships within a comprehensive strategic framework. This study addresses this gap by integrating multiple strategic dimensions—namely strategic thinking, dynamic capabilities, transformational leadership, competitive advantage, sustainable business performance, entrepreneurial orientation, and business model innovation—to propose a holistic model for sustaining competitiveness. Additionally, this research redefines the roles of certain independent variables as mediating and moderating variables, offering fresh insights into enhancing organizational efficiency and long-term performance.

As companies face increasing market complexities, the ability to develop strategic foresight, foster transformational leadership, and leverage business model innovation is paramount. By integrating these elements into a unified strategic framework, this study aims to provide

actionable insights for enhancing business resilience, sustaining performance, and strengthening competitive positioning in an unpredictable economic environment.

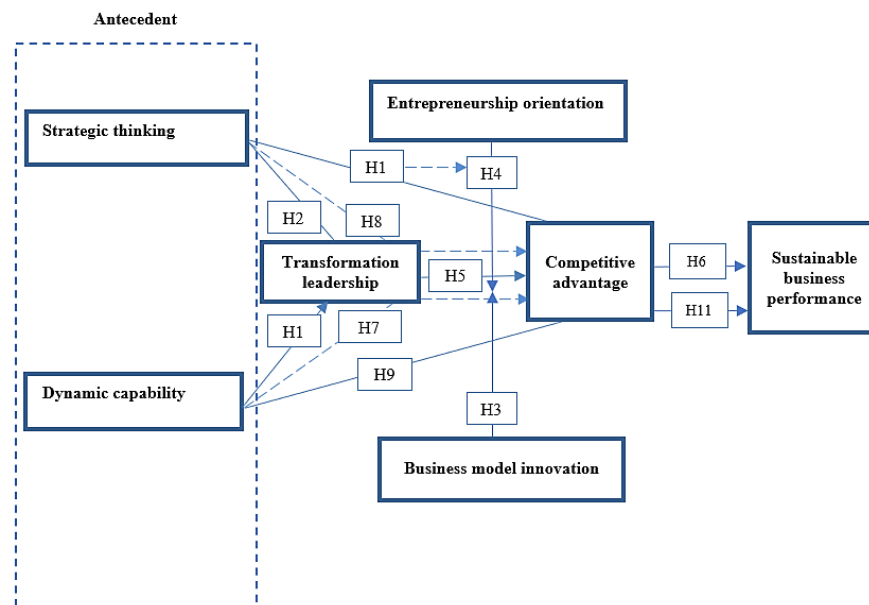


Figure 1. Conceptual Framework

2. Method

The research method used in this study is quantitative research by collecting data through research instruments with a cross-sectional data model, where data is gathered at a single point in time. The study examines the influence of strategic thinking and dynamic capability —as part of the Antecedent System Organization— on enhancing competitive advantage. Additionally, it investigates the relationship between transformational leadership, entrepreneurship orientation, business model innovation, and competitive advantage in achieving sustainable business performance.

The research utilized survey-based data collection, where respondents provide their perceptions through structured questionnaires. A questionnaire is an efficient data collection technique for obtaining information from respondents (Sugiyono, 2019). The sampling method applied in this study is convenience sampling, specifically targeting top management executives, including owners, CEOs, directors, and general managers from medical device manufacturers and healthcare facilities/industries in Indonesia.

Data analysis follows quantitative and statistical methods, incorporating hypothesis testing to establish causal relationships between variables (Sekaran & Bougi, 2010). The study also integrates literature reviews and theoretical models to develop a comprehensive framework.

Sampling Techniques

The sample was taken using a non-probability sampling with a purposive sampling approach, which is a technique for selecting samples based on specific criteria or considerations. Sugiyono (2019) states that a population is a generalization area consisting of objects or subjects with specific qualities and characteristics that have been defined for study, allowing conclusions to be drawn. The determination of the sample population aims to facilitate the selection of the sample size from the population and to limit the scope generalization in the research findings. The population in this study includes all members of the Indonesian Association of Medical Device Manufacturers (ASPAKI) and healthcare facilities/industries. Based on the Hair sampling calculation, in this study, the number of indicators used is 70, thus the minimum required sample size is 5 times 69, it is known that the number of samples is 345 respondents who are top management leaders at the levels of owner, CEO, commissioner, director, deputy director, general manager, and manager. A number of 346 questionnaires distributed to respondents. The distribution of questionnaires in this study used research data collection techniques via email, WhatsApp, and filled out directly by respondents during the medical device exhibition.

Data Analysis Methods

Data analysis in this study used the SEM-PLS (Structural Equation Model-Partial Least Squares) method with AMOS (Analysis of Moment Structure) software. SEM is multivariate analysis technique that combines factor analysis and regression (correlation) analysis to examine relationships between variables. The uses of SEM aim to achieve a higher level of analytical accuracy (Santoso, 2012). AMOS is a statistical software used for multivariate data analysis. The use of AMOS is intended to assist researchers in simplifying the calculation and analysis process, making it more efficient and systematic.

Hypothesis Testing

Hypothesis testing used in this study consists of direct relationship hypothesis test and indirect relationship hypothesis test. In the direct relationship hypothesis test, the significance level of this study is determined using hypothesis analysis criteria in the structural model with t-table value of 1.96 for 5% significance level (Hair et al., 2019). Sekaran & Bougie (2016) stated that to find out whether a significant relationship can be seen from the P-value, whether the hypothesis is supported or not. If the p-value is below α (0.05) it can be said to be significant, the H_0 is rejected, if the p-value is higher than α (0.05), then H_0 fails to be rejected.

The hypothesis design in this study to be tested is as follows:

- $H_0: \beta = 0$; this means that the independent variable has no effect on the dependent variable
- $H_0: \beta > 0$; this indicates that the independent variable has a positive effect on the dependent variable.

Indirect effect hypothesis test aims to determine whether there is a mediating role in the relationship between variables using the procedure developed by Sobel. The Sobel test is used to measure the strength of the indirect effect of the independent variable (X) on the dependent

variable (Y) through the mediating variable (M). The formula for testing the mediation role using the Sobel Test is as follows:

$$S_{ab} = \sqrt{(b^2 S_a^2 + a^2 S_b^2 + S_a^2 S_b^2)}$$

Where:

S_{ab} : Standard error of the indirect effect.

S_a : Standard error of the relationship between the independent variable (X) and the mediating variable (M).

S_b : Standard error of the relationship between the mediating variable (M) and the dependent variable (Y).

a: Regression coefficient from the independent variable (X) to the mediating variable (M).

b: Regression coefficient from the mediating variable (M) to the dependent variable (Y)

To test the significance of the indirect relationship partially, the following formula is used $t = (ab) / S_{ab}$; if $t \geq 1.96$, then the mediating variable (M) plays a role in the effect of the independent variable (X) on the dependent variable (Y).

3. Results

The table below presents an overview of the respondents' profiles, summarizing their demographic and professional information.

Table 1. Respondent Demographics

No	Characteristics	Frequency	Percentage
1.	Age group		
	20-31 years	213	61,6
	32-36 years	41	11,8
	37-45 years	58	16,8
	46-50 years	17	4,9
	> 50 years	17	4,9
	Total	346	100
2.	Education		
	High school/equivalent	157	45,4
	Diploma/equivalent	41	11,8
	Bachelor/equivalent	110	31,8
	Master/equivalent	23	6,7
	Doctoral/equivalent	15	4,3
	Total	346	100
3.	Job position		
	Chief Executive Officer	37	10,7
	President director	7	2
	Director	16	4,6
	Deputy Director	2	0,6
	General Manager	8	2,3
	Manager	46	13,3

No	Characteristics	Frequency	Percentage
	Assistant Manager	21	6,1
	Supervisor/Senior Staff	209	60,4
	Total	346	100
4.	Business type		
	Manufacturer/factory	102	29,5
	Trade	39	11,3
	Distribution	38	11
	Healthcare facilities	167	48,3
	Total	346	100
5.	Length of work		
	1-5 years	219	63,3
	6-10 years	57	16,4
	11-15 years	40	11,6
	> 15 years	30	8,7
	Total	346	100

Source: Processed by Researcher

Analysis of Research Results

To assess the overall adequacy of the proposed structural model, several goodness-of-fit indices were computed. These indices help determine how closely the model matches the observed data, confirming the validity of the proposed relationships between variables. The table below displays the primary goodness-of-fit metrics, including absolute, incremental, and parsimonious fit indices, along with their respective threshold values. Each index is evaluated against its suggested criteria to assess the model's fit.

Table 2. Composite Reliability Test Results and Cronbach's Alpha

Variables	Requirement	Composite Reliability	Cronbach's Alpha	Conclusion
Business Model	> 0.70	0.919	0.869	Reliable
Innovation	> 0.70	0.941	0.921	Reliable
Competitive Advantage	> 0.70	0.935	0.913	Reliable
Dynamic Capability	> 0.70	0.931	0.889	Reliable
Entrepreneurship Orientation	> 0.70	0.931	0.889	Reliable
Sustainable Performance	> 0.70	0.891	0.837	Reliable
Strategic Thinking	> 0.70	0.952	0.933	Reliable
Transformation Leadership	> 0.70			

Source: Processed by Researcher using SmartPLS 3.0

Hypothesis Test Results Study

The tables below present a summary of the hypothesis testing outcomes from this study.

Table 3. Results of Direct Relationship Hypothesis Testing

Hypothesis testing	Estimate	p-Value	Result
H1 <i>Strategic Thinking (ST) → Transformational Leadership (TL)</i>	0.099	0.040	Supported
H2 <i>Dynamic Capability (DC) → Transformational Leadership (TL)</i>	0.699	0.000	Supported
H3 <i>Strategic Thinking (ST) → Competitive Advantage (CA)</i>	0.170	0.001	Supported
H4 <i>Dynamic Capability (DC) → Competitive Advantage (CA)</i>	0.027	0.397	Not supported
H5 <i>Transformational Leadership (TL) → Competitive Advantage (CA)</i>	0.223	0.001	Supported
H10 <i>Competitive Advantage (CA) → Sustainable Business Performance (SBP)</i>	0.826	0.000	Supported

Source: Processed by Researcher using SmartPLS 3.0

Table 4. Results of Indirect Relationship Hypothesis Testing

Hypothesis testing	Estimate	p-Value	Result
H6 <i>Strategic Thinking (ST) → Transformational Leadership (TL) → Competitive Advantage (CA)</i>	0.022	0.073	Supported
H7 <i>Dynamic Capability (DC) → Transformational Leadership (TL) → Competitive Advantage (CA)</i>	0.156	0.001	Supported
H8 <i>Transformational Leadership (TL) → Entrepreneurship Orientation (EO) → Competitive Advantage (CA)</i>	0.029	0.352	Not supported
H9 <i>Transformational Leadership (TL) → Business Model Innovation (BMI) → Sustainable Competitive Advantage (SCA)</i>	-0.037	0.306	Not supported

Source: Processed by Researcher using SmartPLS 3.0

4. Discussion

H₁: The Positive Influence of Strategic Thinking on Transformational Leadership

This study demonstrates that Strategic Thinking significantly enhances Transformational Leadership, particularly in driving organizational effectiveness, adaptability, and long-term sustainability. Strategic Thinking involves key elements such as industry trend analysis, long-term vision, proactive risk management, and data-driven decision-making. It enables

transformational leaders to foster supportive environments, guide organizational change, and improve employee performance—findings supported by prior research (Puspitaria & Hendarsjah, 2022; Putri et al., 2020).

In the medical device manufacturing industry in Indonesia, where technological and regulatory shifts are frequent, the integration of strategic thinking is critical. Leaders lacking strategic vision risk being reactive, stifling innovation, and reducing employee motivation. The study also notes the industry's young workforce (ages 20–31), highlighting the importance of leadership strategies that support skill development and engagement. Overall, the research underlines the importance of strategic thinking in strengthening transformational leadership to ensure organizational resilience and growth.

H₂: The Positive Influence of Dynamic Capability on Transformational Leadership

This study confirms that Dynamic Capability positively influences Transformational Leadership, especially within Indonesia's medical device manufacturing industry. Organizations with strong dynamic capabilities—such as adaptability to change, innovation, crisis management, and cross-functional collaboration—enhance their leadership effectiveness. These capabilities enable transformational leaders to drive innovation, foster a culture of learning, and respond proactively to industry shifts.

Findings are consistent with prior research by Daeli et al. (2024) and Asbari & Novitasari (2024), which emphasize the role of transformational leadership in boosting employee performance, promoting innovation, and cultivating an adaptive workplace culture. In contrast, the absence of dynamic capability hampers decision-making and innovation, limiting an organization's ability to compete effectively.

Statistical evidence from this study supports a strong positive correlation between dynamic capability and transformational leadership, reinforcing the need for companies to develop flexible, innovation-driven employees. Ultimately, integrating Transformational Leadership with Dynamic Capability is essential for sustaining competitiveness, navigating industry complexities, and driving long-term growth.

H₃: The Positive Influence of Strategic Thinking on Competitive Advantage

In the medical device manufacturing industry, the implementation of strategic is becoming increasingly crucial due to intense competition, evolving regulatory frameworks, and rapid technological advancement. Companies with strong strategic thinking capabilities can develop superior product innovations, optimize operational efficiency, and establish strategic partnerships that enhance competitive advantage. Furthermore, strategic thinking enables companies to allocate resources more effectively, thereby increasing added value for customers while strengthening their market position.

The findings of this study emphasize the crucial role of strategic thinking in enhancing competitive advantage. Medical device manufacturing companies aiming to strengthen their competitiveness must integrate strategic thinking into decision-making process, business planning, and innovation management. By effectively implementing strategic thinking, companies can anticipate industry dynamics, optimize resources, and achieve sustainable competitive advantage. Strategic thinking has a positive impact on competitive advantage in Indonesia's medical device manufacturer. It enables companies to formulate a long-term vision, anticipate market changes, and develop strategies that are adaptable to industry dynamics. Through this approach, companies can identify opportunities and threats at an early stage, allowing them to make more precise decisions to enhance their competitiveness.

Aligned with previous research, Liedtka (1998) revealed the companies that systematically implement strategic thinking are better equipped to adapt changes in the business environment and develop more competitive strategies. Tamilarasu et al. (2023) indicated that strategies emerging from strategic thinking can enhance organizational motivation and productivity. However, these strategies must be periodically evaluated, as an organization's future can be projected based on its past performance. Therefore, the ability to think strategically in a timely manner enables managers to continuously analyze and refine the organization's mission and vision. Making the right decisions at the right time helps organizations maintain their competitive edge and prevent decline by ensuring that implemented changes contribute positively to organizational performance.

H4: The Positive Influence of Dynamic Capability and Competitive Advantage

The study reveals that Dynamic Capability alone does not directly influence competitive advantage in Indonesia's medical device manufacturing industry. While dynamic capability includes adaptability, innovation, flexibility, and collaboration, these attributes are not sufficient on their own to establish a competitive edge. Effective competitive strategy, transformational leadership, and strategic thinking are essential to translate dynamic capabilities into actual competitive benefits.

This aligns with prior research by Zahra & George (2002), Gumusluoglu & Ilsev (2009), and Teece (1997), who argue that without leadership and strategy, dynamic capabilities merely function as internal mechanisms without generating market-level advantages.

Several industry-specific factors contribute to this lack of direct impact: strict regulations, dependence on imported technology and materials, and insufficient strategy in innovation implementation. The study concludes that transformational leadership and strategic thinking serve as critical links, enabling companies to convert dynamic capabilities into real, sustainable competitive advantage. As a result, organizations must focus on strategic leadership approaches and structured innovation processes to fully leverage their dynamic capabilities and remain competitive in a challenging industry landscape.

H₅: The Positive Influence of Transformational Leadership on Competitive Advantage

The study indicates that transformational leadership has a positive influence on competitive advantage. These findings suggest that the stronger the implementation of transformational leadership within an organization, the greater the company's competitiveness will be. Transformational leadership drives product and process innovation, accelerates adaptation to technological and regulatory changes, and fosters a collaborative, performance-oriented work environment. By cultivating an innovative, flexible, and market-responsive organizational culture, transformational leaders strengthen a company's competitive advantage, particularly in the medical device manufacturing industry.

These findings align with previous studies examining the relationship between transformational leadership and competitive advantage. Cui (2024) explored the impact of transformational leadership on competitive advantage through the mediating roles of digital transformation, organizational agility, and innovation capability. The results indicate that transformational leadership positively influences digital transformation, which in turn enhances competitive advantage through organizational agility and innovation capability. This study underscores the importance of leadership-driven digital initiatives in sustaining competitive performance in a dynamic market.

H₆: The Positive Influence of Strategic Thinking on Competitive Advantage through Transformational Leadership

This study indicates that strategic thinking influences competitive advantage, but this impact does not occur directly. Dynamic capability, which encompasses the ability to adapt to regulations and technology, innovation in products and production processes, flexibility in addressing business challenges, continuous learning, and cross-functional collaboration, has the potential to enhance a company's competitiveness. However, without the role of transformational leadership, the impact of dynamic capability on Competitive advantage cannot be fully optimized. Transformational leadership acts as an intermediary in guiding and maximizing the utilization of dynamic capability. Transformational leaders can establish a clear vision, empower employees, and drive innovation and adaptation within the organization. Transformational leadership in Indonesia's medical device and healthcare industries serve as a key driver in enhancing corporate competitiveness. This role becomes even more crucial given that the majority of respondents in this study have an educational background equivalent to high school.

Furthermore, transformational leadership also acts as an intermediary in guiding and optimizing the utilization of the organization's strategic thinking framework. Organizations are better equipped to effectively manage their resource and capabilities to achieve competitive advantages. Eisenhardt & Martin (2000) supported these findings, stating that companies that develop Dynamic Capability through strategic thinking can enhance decision-making flexibility and accelerate product and process innovation. These findings reinforce that Strategic Thinking

plays a crucial role in enhancing organizational competitiveness by providing a clear strategic direction, while Transformational Leadership is essential in ensuring that the strategy is effectively translated into concrete actions. Therefore, medical device manufacturing industries seeking to enhance their competitiveness should consider how transformational leadership can support the management of dynamic capability, ensuring that the designed strategies are optimally implemented.

H₇: The Influence of Dynamic Capabilities on Competitive Advantage through Transformational Leadership

This study highlights that Dynamic Capability influences competitive advantage indirectly through Transformational Leadership. While dynamic capabilities—such as adaptability, innovation, and cross-functional collaboration—hold significant potential to enhance competitiveness, they require effective leadership to be fully utilized. Transformational Leadership acts as a mediator, translating these capabilities into actionable strategies that drive competitive success.

In Indonesia's medical device manufacturing industry, this mediated relationship is especially critical due to strict regulations, technological disruption, and global competition. Transformational leaders foster innovation, adaptability, and empower a predominantly young, less-experienced workforce to contribute meaningfully to industry growth and innovation. Without transformational leadership, dynamic capabilities risk being underutilized, leading to competitive stagnation and reduced responsiveness to change. This reinforces the need for leadership development as a strategic priority. Supporting this view, Rono et al. (2024) also found that transformational leadership mediates the dynamic capability–competitive advantage relationship in manufacturing firms, enhancing organizational adaptability and long-term competitiveness. Overall, strengthening transformational leadership is essential to unlock the full potential of dynamic capabilities and achieve sustainable competitive advantage in the industry.

H₈: The Negative Influence of Transformational Leadership on Competitive Advantage moderated by Entrepreneurial Orientation

This study finds that Entrepreneurship Orientation does not positively moderate the relationship between Transformational Leadership and Competitive Advantage in Indonesia's medical device manufacturing industry. Although transformational leadership typically enhances competitiveness, the expected strengthening effect from entrepreneurship orientation—characterized by innovation, risk-taking, and proactiveness—was not observed. In fact, the study revealed an unexpected negative impact.

A key reason lies in the demographics of the industry's workforce, which is predominantly young and holds only a high school education. This limits employees' understanding and application of entrepreneurial principles, weakening the synergy between leadership and competitiveness. While previous research supports the importance of entrepreneurship

orientation in enhancing leadership outcomes, the gap in entrepreneurial knowledge among workers may hinder this dynamic.

To address this, companies should implement structured training programs to build foundational entrepreneurial skills and foster a culture of innovation. Integrating transformational leadership with entrepreneurship education and incentives can empower the workforce, drive adaptability, and improve long-term competitiveness.

Given the industry's regulatory constraints and reliance on imported products, firms must also pursue collaborations with government, research institutions, and startups to enhance innovation and market positioning. Overall, the findings stress that transformational leadership must be supported by a strong entrepreneurship orientation to yield a sustainable competitive advantage in the healthcare and medical device sectors.

H₉: The Negative Influence of Transformational Leadership on Competitive Advantage moderated by Business Model Innovation

The study reveals that transformational leadership does not positively influence competitive advantage when moderated by business model innovation. While previous hypotheses indicated a positive relationship between transformational leadership and competitive advantage, business model innovation unexpectedly exerted a negative impact. Conceptually, business model innovation plays a crucial role in creating new value, aligning strategies with market dynamics, and enhancing operational efficiency. However, its role appears to be weaker in the healthcare industry. Ineffective business model innovation may hinder the optimization of transformational leadership's impact on Sustainable competitive advantage. Therefore, medical device manufacturers cannot rely solely on transformational leadership. They must also ensure that business model innovation is effectively implemented to sustain competitiveness in an evolving industry.

Previous research findings by Anwar (2018) revealed that business model innovation has a significant impact on SME performance through the mediation of competitive advantage. However, without an effective business model innovation, transformational leadership alone is insufficient to achieve sustainable competitive advantage. These findings indicate that business model innovation plays a crucial role in moderating the relationship between transformational leadership and sustainable competitive advantage.

H₁₀: The Positive Influence of Competitive Advantage on Sustainable Business Performance

The study confirms that competitive advantage has a significant positive impact on sustainable business performance in Indonesia's healthcare manufacturing industry. Competitive advantage—achieved through innovation, operational efficiency, product differentiation, and adaptability—enables companies to maintain profitability, market relevance, and long-term continuity.

Without competitive advantage, businesses struggle with market adaptation, technological changes, and regulatory compliance, leading to reduced customer loyalty, efficiency, and innovation. This is especially critical in a sector where the workforce is primarily aged 20–30 with high school-level education. As such, continuous training, skill development, and knowledge transfer are essential to bridge educational gaps and support innovation. The findings align with Purnama et al. (2018), who highlight the importance of resource planning, innovation, and product differentiation, and Farida et al. (2022), who emphasize that dynamic capabilities help organizations respond to change and strengthen competitiveness. To ensure sustainable business performance, companies in this sector must integrate innovation-driven strategies and actively manage their competitive advantage.

5. Conclusion

Based on the hypothesis testing results, this study concludes that transformational leadership, competitive advantage, and sustainable business performance in Indonesia's medical device and healthcare facility industry are influenced by various factors, including strategic thinking and dynamic capability. Each factor plays a critical role, either directly or through mediating and moderating effects. The findings demonstrate that strategic thinking and dynamic capability enhance transformational leadership, which in turn drives competitive advantage and long-term business performance. However, moderating factors such as entrepreneurial orientation and business model innovation do not show a significant positive effect, indicating the need for more effective implementation strategies. Overall, this study highlights the importance of integrating leadership, innovation, and human capital development to strengthen competitiveness and ensure sustainability in the healthcare manufacturing sector.

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