Exploring Key Factors in Corporate Merger and Acquisition Decisions from a System Dynamics Perspective

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Abstract

This study examines the impacts of operational performance, synergy effects, market competition, corporate sustainability policies, and internal communication on merger and acquisition (M&A) decisions and long-term development from the perspective of System Dynamics (SD). Traditional M&A decision-making methods, often reliant on stable market conditions, are increasingly limited in dynamic and complex environments. This research develops a comprehensive SD model, analyzing four key causal loops: the effect of operational performance on investment attractiveness, the synergy effect of M&A decisions on market competitiveness, and the impact of internal communication on M&A decisions. The model's validity and practical applications were demonstrated using a case study of a renowned Taiwanese optoelectronics company.

The findings reveal: (1) Operational performance is critical for attracting investments and fostering long-term development. Strong operational performance enhances profitability and market competitiveness. (2) Synergy effects significantly enhance market competitiveness. (3) When market confidence declines, companies may experience deteriorating operational performance and seek alternative, more promising, or stable investment targets to diversify risks. (4) Effective internal communication within organizations enhances decision-making quality and profitability.

Keywords: System Dynamics, Merger and Acquisition, Corporate Social Responsibility, Synergy Effects

JEL Classifications: M0, M1, G3

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1. Introduction

Mergers and acquisitions (M&As) serve as strategic tools for companies seeking to enhance their market power and bolster competitiveness (Battisti et al., 2023). By merging with or acquiring other firms, businesses can expand their market share, diversify product offerings, and streamline operations (Hossain, 2021a). This process often leads to increased economies of scale, improved efficiency, and strengthened market positioning, allowing companies to better compete within their industry (Vinocur et al., 2022).

Accessing relevant and timely reports for decision-making is particularly important in Taiwan's technology sector, known for rapid innovation and a highly competitive landscape (Yiu et al., 2020). The market is dynamic and volatile, influenced by global supply chain shifts and strong emphasis on industries like technologies. Timely insights are essential for companies to remain agile, adapt to changes, seize new opportunities, and sustain their competitive advantage in this fast-paced environment. This evolving landscape poses substantial challenges for investment decision-making, particularly within Taiwan's technology sector, firms must balance technology investments, R&D costs, and market uncertainties to maintain competitiveness and avert obsolescence (Duan et al., 2021). This study addressed important claims regarding whether M&As is due to multiple factors.

The highly volatile business environment compels companies to adapt and innovate at an accelerated pace to sustain their competitive edge (Sarangdhar et al., 2024). In Taiwan's highly dynamic and competitive market, businesses face increasing pressure from global competitors with superior capital, technology, or management practices. The limited domestic market size further intensifies competition, requiring firms to adopt agile decision-making strategies. To meet these challenges, firms in Taiwan need to refine their M&A decision-making processes, taking into account internal financial and resource capacities while thoroughly assessing market demand, technological advancements, and changes in governmental environmental policies (Lau et al., 2012; J. Li, 2022).

The rapid pace of technological innovation can also shift competitive dynamics, introducing new risks and opportunities (Dagnino et al., 2021). For example, the emergence of artificial intelligence (AI), big data, and blockchain has transformed technology firms, requiring substantial investment and strategic management for successful implementation. Firms must continuously innovate and adjust their technologies to anticipate future trends and secure strategic positions.

Governmental regulatory policies are another significant influence on M&A decision-making. With increasing concerns about climate change, resource depletion, and social inequalities, governments have raised environmental standards and corporate social responsibility (CSR) expectations. Taiwan's optoelectronics market has benefited from supportive policies such as the "Green Technology Industry Innovation Promotion Program" and the "Renewable Energy Development Act," which have accelerated industry growth. Studies demonstrate a positive correlation between CSR and environmental investments, showing that such practices not only enhance financial performance but also bolster competitiveness (C. Li et al., 2022). Research also

indicates that companies implementing effective environmental policies can mitigate environmental risks and generate shareholder value, though mere sustainability efforts without risk management may fail to attract investment (Lashitew, 2021).

There have been numerous studies were carried out on the factors that affected M&As. The study we present in the present paper attempts to supplement the findings of these earlier studies. It is similar to the previous studies discussed above, in that the focus is on command of the variables which affected the M&A process (R. Caiazza & Volpe, 2015; Peng et al., 2024). It differs from previous studies, however, in the way using the system dynamics model as a research method. In general, the whole picture between mergers and acquisitions is a neglected area. At present, most of the research studies are one-dimensional, and few studies explore corporate M&A decision-making from an overall system perspective. Therefore, this study uses a system dynamic perspective to analyze the operation of corporate M&A systems and the causal relationships of related explanatory variables.

The purpose of this paper is to describe an application of system dynamics model to M&As. More specifically, this study was undertaken in order to understand how the causal relationships of related explanatory variables over M&As process, and to suggest some theoretical as well as practical implications of this process. The system dynamics model used for this study, in fact, be used for M&As, this model can become a useful tool in future research.

2. Literature Review

2.1. Resource-Based Theory & Mergers and Acquisitions

The Resource-Based Theory (RBT) posits that a firm's ability to maintain a sustainable competitive advantage lies in its possession of valuable, rare, inimitable, and non-substitutable (VRIN) resources. This theory has been a cornerstone for understanding strategic decisions, including mergers and acquisitions (M&A). M&A designed to acquire new resources. The RBT framework emphasizes that acquiring resources through external channels like M&A can help firms expand their strategic capabilities and enhance their market positioning (Eschen & Bresser, 2005). The desire to internalize critical resources that contribute to competitive advantage, such as technological expertise, market reach, or operational efficiencies. Acquiring firms with greater innovative capabilities are likely to choose target firms in nations with less regulative distance from their home market; whereas firms with greater financial capabilities target firms in more distant nations (Parente et al., 2020). For serial acquirers, M&A capability has a positive impact on long-term firm performance, as reflected in return on equity and price-to-book value; additionally, company size and the frequency of acquisitions play a role in shaping M&A capability (Vinocur et al., 2022).

Several studies have noted that sustainability factors matters in long-term post merger performance. To achieve the best outcomes from an acquisition, managers should recognize that shareholder value—measured in terms of both financial performance and sustainability—tends to be greater in the post-merger period when the acquiring company initially possesses a high level of sustainability (S. Caiazza et al., 2021). By integrating these resources, Company can potentially

improve its profit rate and overall market competitiveness, which in turn enhances its long-term viability and economic value.

Mergers and acquisitions have been widely studied for their impact on corporate strategy, growth, and market dynamics. The primary motivations behind M&A activities typically include achieving synergies, diversifying product lines, entering new markets, and enhancing operational efficiencies (Feldman & Hernandez, 2022). However, the success of M&A is contingent on various factors, such as the compatibility between the merging entities, the effectiveness of post-merger integration, and the strategic alignment of objectives. The operational performance of the target company and its investment attractiveness play critical roles in shaping the decision-making process of the acquire company. Scholars have also highlighted the importance of communication between management teams during the M&A process and the subsequent acceptance level within the organizations (Angwin et al., 2016; Diduc, 2022). These elements collectively determine the realization of synergistic benefits and contribute to the success of the merger.

Corporate M&A are complex decisions that involve a combination of factors that shape the outcome of the deals. The strategy employed in M&A plays a crucial role in determining the success of the transaction (Hossain, 2021b). Decision makers must carefully consider various elements such as financial implications, market conditions, and organizational culture to ensure a smooth integration process. Additionally, the integration of Artificial Intelligence (AI) in business operations has the potential to influence M&A decisions by providing valuable insights and enhancing decision-making processes (Zhang et al., 2024). In the context of big data analytics, companies are increasingly leveraging their capabilities to gain a competitive advantage and drive business value (Capurro et al., 2021). The ability to analyze large volumes of data can provide valuable insights that inform strategic decisions, including those related to M&A. Furthermore, research and development (R&D) spending decisions in industries are influenced by various factors, including regulatory requirements and market dynamics (Romasanta et al., 2020). Legal and ethical considerations also play a significant role in corporate control issues, especially in the context of mergers and acquisitions (Teti & Spiga, 2023). Understanding the regulatory landscape and ensuring compliance with relevant laws are essential aspects of successful M&A transactions. Moreover, cultural compatibility plays a crucial role in enabling companies to operate based on shared or similar visions (Gazzola et al., 2022). Acquiring firms with higher Environmental, Social, and Governance (ESG) ratings significantly enhance post-merger operational performance, whereas firms with lower ESG scores or ratings do not exhibit such improvement (Teti & Spiga, 2023). In conclusion, examining key factors in corporate merger and acquisition decisions involves considering a wide range of elements, including strategy, AI integration, R&D spending, legal and ethical considerations, organizational culture, and governance practices. By carefully evaluating these factors, decision makers can enhance the likelihood of successful M&A transactions and create long-term value for their organizations.

2.2. System Dynamics

System Dynamics (SD) is an approach to understanding the behavior of complex systems over time. The system dynamics (SD) approach provides analytical tools to map the causal relationships between elements of a system and to deepen understanding of the dynamics driven by these connections (Forrester, 1994; Richardson & Pugh, 1997).

Pioneered by Forrester (1961), SD involves the use of feedback loops, stock-and-flow structures, and time delays to model dynamic interactions within a system. When applied to M&A, SD can offer valuable insights into the interdependencies among variables such as profit rates, revenue, and resource allocation. For instance, modeling the collaboration between the acquirer company and the target company can illustrate how changes in operational performance impact profit rates and overall revenue. Highlights the complex interconnections among organizational capabilities, culture, and employee commitment in the context of two merging companies (Miczka & Größler, 2010).

Earlier studies examining domestic mergers and acquisitions (M&As) in developed economies (DEs) have identified the presence of complex non-linear relationships; these findings highlight the necessity for further research employing alternative classification techniques, particularly those emphasizing predictive accuracy (Kumar & Sengupta, 2020). Effective communication following an acquisition depends not only on the accuracy and timeliness of the information shared but also on employees' perceptions of fairness and the rationale behind decision-making (Bansal & King, 2022). By incorporating SD modeling into M&A research, decision-makers can better anticipate the long-term impacts of strategic decisions and design more robust post-merger strategies.

In summary, this literature review underscores the interconnectedness of Resource-Based Theory, M&A strategies, and System Dynamics. These frameworks collectively provide a comprehensive understanding of the factors influencing corporate M&A decisions and highlight the importance of aligning strategic resources, effective communication, and integration processes to achieve sustainable growth and competitive advantage. While SD offers insights into the dynamic interactions in M&A, integrating it with RBT can provide a more holistic view of resource acquisition and strategic adaptation, as discussed in the next section.

2.3. Theoretical Integration and Model Foundation

Building on the discussions of Resource-Based Theory (RBT) and System Dynamics (SD), this section integrates these two frameworks to construct a more comprehensive analytical approach to mergers and acquisitions (M&A). Existing literature highlights the crucial roles of Resource-Based Theory (RBT) and System Dynamics (SD) in mergers and acquisitions (M&A) research. RBT emphasizes that firms use M&A to acquire rare and inimitable resources that enhance their competitive advantage (Srivastava, 2024). At the same time, SD provides a systematic perspective for analyzing the nonlinear dynamics of the M&A process, such as resource integration, organizational culture shifts, and performance fluctuations (Forliano et al., 2024). These two

frameworks are complementary: RBT explains why firms pursue acquisitions, whereas SD elucidates how post-merger integration unfolds and affects long-term outcomes. By combining RBT and SD, this study aims to develop a more comprehensive analytical framework that captures key factors influencing M&A success, including resource alignment, synergy realization, decision-making adjustments, and market dynamics.

3. Research Design

System thinking is an approach to analyzing complex systems by identifying the interrelationships and feedback mechanisms among elements. This method allows decision-makers understand merger and acquisition (M&A) behaviors, particularly in dynamic environments influenced by multiple factors. This study applies system dynamics to explore the key factors influencing corporate M&A decisions, utilizing mathematical modeling to simulate the internal interactions and causal loops within the system to better understand behavioral changes and their contributing factors.

First, through a literature review, key factors influencing M&A decisions are identified, followed by interviews with industry professionals to pinpoint critical variables. These factors include, but are not limited to, company revenue, profitability, the operational status of target companies, market demand, market competitiveness, and changes in government regulations. These variables form the stock and flow elements within the model.

Next, causal loop diagrams are developed to describe the cause-and-effect relationships among the variables. The research framework divides these interrelated factors into three parts for model introduction: Firstly, the causal loop exploring how the operational status of the target company influences investment attractiveness; secondly, the analysis of the synergistic effects of corporate M&A decisions on market competitiveness; and finally, an investigation into how internal communication within the investing company influences decision-making when the target company's operational status is favorable.

3.1. Research Samples and Data Sources

This study selects a well-known Taiwanese optoelectronics company (hereinafter referred to as Company A) as the case study subject. Company A is a medium-to-large enterprise with leading technical expertise and market position in the optoelectronics industry. It also boasts a well-established capital allocation and management decision-making structure. These characteristics make its M&A decision-making process and influencing factors representative, providing detailed and reliable data support. Furthermore, Company A enjoys high visibility in the Taiwanese market, and its M&A decisions have significant impacts on both the market and the industry. Studying this company offers practical insights and serves as a valuable reference for other enterprises.

A brief statistical summary of Company A’s financial performance before and after the acquisition is provided to further support the analysis. Before the merger, Company A’s revenue was

around NT$14.5 billion. Post-merger, revenue nearly doubled to approximately NT$28.9 billion, reflecting significant growth. Additionally, the profit rate after the acquisition reached approximately 90%, indicating notable operational efficiency and financial performance improvements. These figures highlight the impact of the merger on Company A's market position and overall business performance, reinforcing the relevance of the system dynamics model in analyzing the causal relationships between acquisition decisions, operational outcomes, and long-term sustainability.

3.2. Model Construction

A dynamic model is constructed using system dynamics software, with initial conditions and parameters set based on actual data. The model simulates Company A's M&A decision-making process regarding the target company (hereinafter referred to as Company B) under various scenarios.

3.3. Causal Feedback Loop Between Operational Performance and Investment Attractiveness of Company B

In the context of Company A's acquisition decision-making process, several interrelated factors come into play. First, the Profit Rate of Company A directly influences its Expected Dividend, as higher profitability typically leads to the expectation of greater dividends for shareholders. This, in turn, boosts the Investment Attractiveness of Company B, as investors tend to seek companies offering stable returns and growth potential.

Simultaneously, the Operational Performance of Company B plays a critical role in determining its ability to attract investment from Company A. A strong operational performance improves the attractiveness of Company B, which encourages Company A to allocate more capital towards the acquisition. As Company A increases its investment in Company B, its Monthly Revenue Rate is expected to rise, reflecting a higher order volume and the need to produce more goods or services.

However, this growth in revenue also leads to an increase in Company A's Costs, including expenses for raw materials, labor, and other operational factors. Despite the higher costs, the increased Revenue of Company A strengthens its financial position, allowing for further profitability and the potential for continued dividend distribution. This creates a positive feedback loop, enhancing the overall investment appeal of Company B and driving Company A's M&A decision-making process. As shown in Figure 1, the Causal Feedback Loop Diagram illustrates the Operational Performance and Investment Attractiveness of Company B.

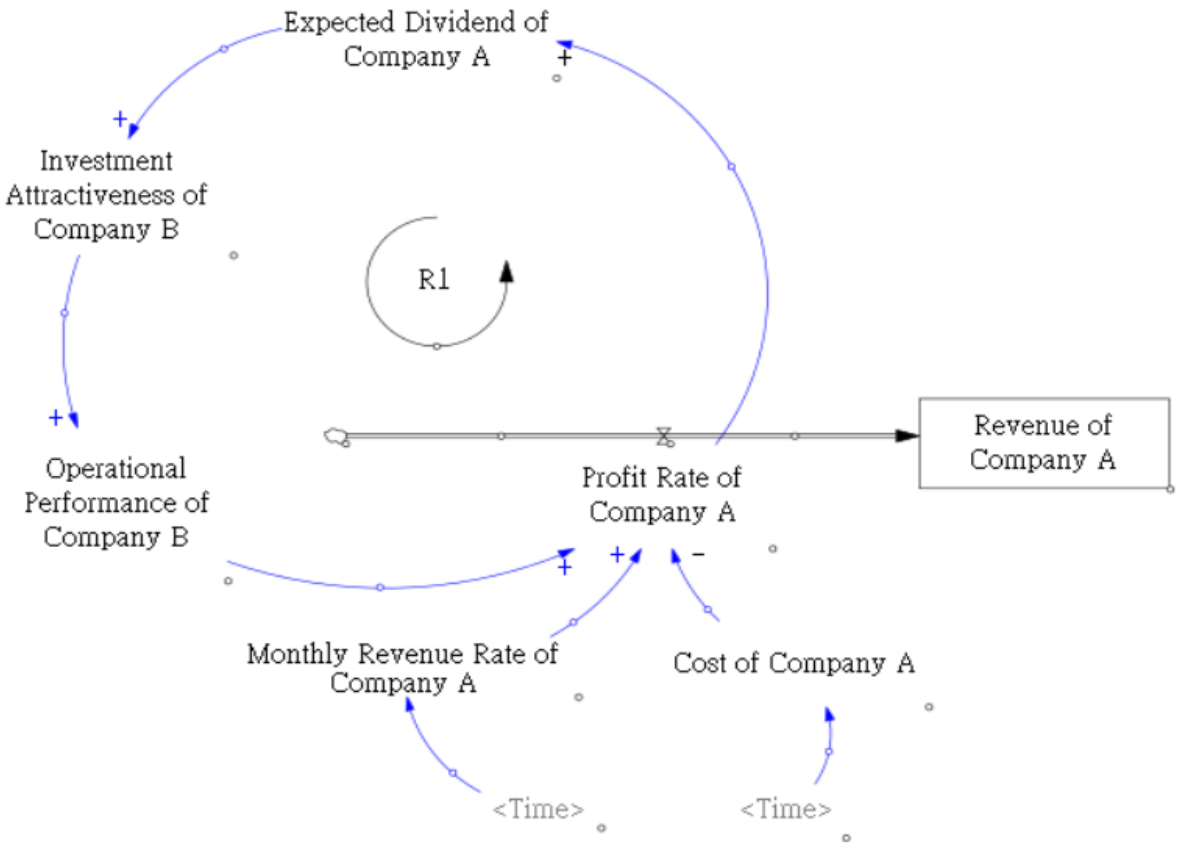

Figure 1. Causal Feedback Loop Diagram of the Operational Performance and Investment Attractiveness of Company B

3.4. Causal Feedback Loop Between Operational Performance and Investment Attractiveness of Company B

In corporate merger and acquisition decisions, Company A must evaluate multiple critical factors to formulate an effective investment strategy. First, the allocation of investment funds is essential to ensure sufficient resources and their efficient utilization. A key aspect in this evaluation is the operational performance of Company B, as stable and strong performance enhances its investment attractiveness, prompting Company A to further assess the potential synergies from collaborating with Company B. This includes examining the compatibility and harmony of the partnership, which directly influences the efficiency and success of the acquisition.

Moreover, the integration of technical expertise from both companies and the subsequent improvement in product and service quality are vital for strengthening Company A's market competitiveness. Enhanced operational performance of Company B increases market confidence, solidifying its position and fostering a positive feedback loop that benefits both parties. This development not only supports Company A's competitive edge but also attracts further investor interest in Company B.

When making investment decisions, Company A must also weigh other potential investment targets to fully assess the comparative value and risks. Through this multifaceted analysis, Company A can optimize its resource allocation strategy, maximize the benefits derived from collaboration,

and contribute to the long-term sustainable development and market presence of Company B. As shown in Figure 2, the Causal Feedback Loop Diagram illustrates the Synergies in Corporate Acquisition Decisions and Market Competitiveness.

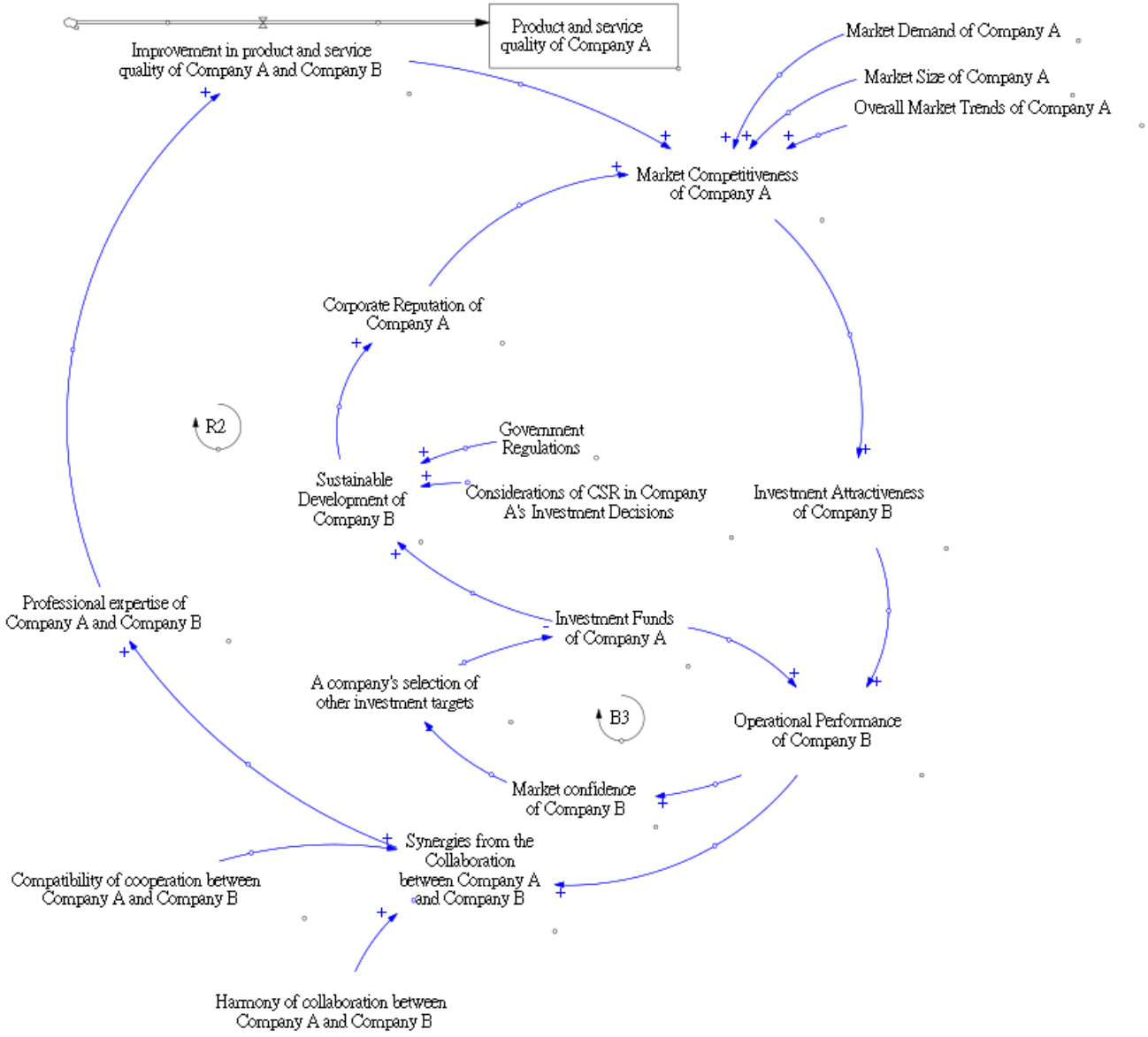

Figure 2. Causal Feedback Loop Diagram of Synergies in Corporate Acquisition Decisions and Market Competitiveness

3.5. Causal Feedback Loop of Internal Communication on Acquisition Decisions

In exploring the key factors influencing corporate merger and acquisition (M&A) decisions from a systems perspective, it is crucial to understand the dynamic interplay between various elements. The profit rate of Company A serves as an indicator of its financial health and capacity for strategic investments. A significant aspect in M&A is the frequency of communication between Company A and its management team during the decision-making process. This communication impacts the acceptance level of the management team, which is critical for aligning strategic goals and facilitating smoother execution of the merger.

The operational performance of Company B plays a pivotal role in determining its investment attractiveness. Strong performance metrics signal stability and potential for growth, enhancing B Company's appeal as an acquisition target. If Company B is attractive from an investment standpoint, this can positively affect Company A's revenue through potential synergies and expanded market opportunities post-merger.

Overall, these interconnected factors—Company A's profit rate, communication and acceptance within its management team, the operational health of Company B, and the resultant revenue implications—form a comprehensive system influencing M&A decisions. The success of such a strategic move hinges on assessing how these variables interact to drive financial growth and strategic fit. As shown in Figure 3, the Causal Feedback Loop Diagram illustrates the relationship between Internal Communication and Acquisition Decisions.

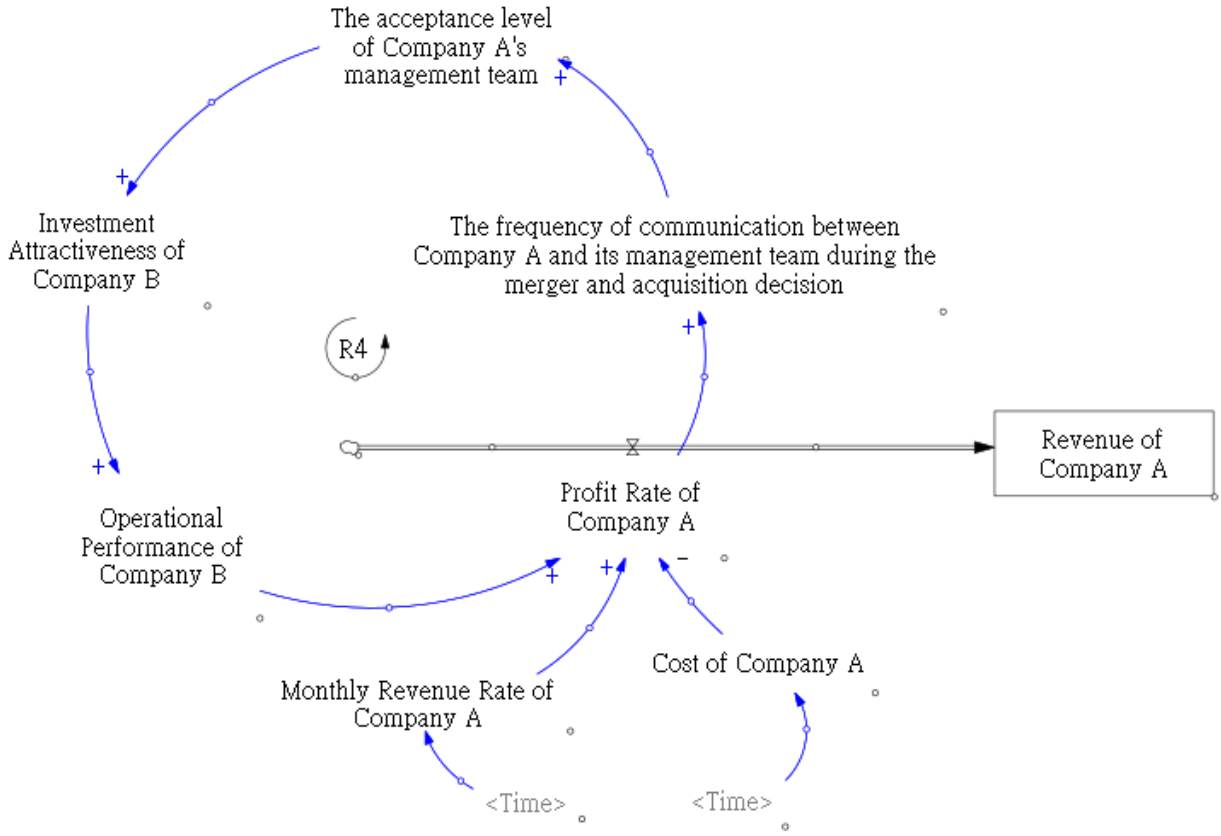

Figure 3. Causal Feedback Loop Diagram of Internal Communication and Acquisition Decisions

3.6. Integrated Feedback Loop of Internal and External Factors on Acquisition Decisions

As shown in Figure 4, the Integrated Feedback Loop Diagram illustrates the relationship between Internal and External Factors and Acquisition Decisions.

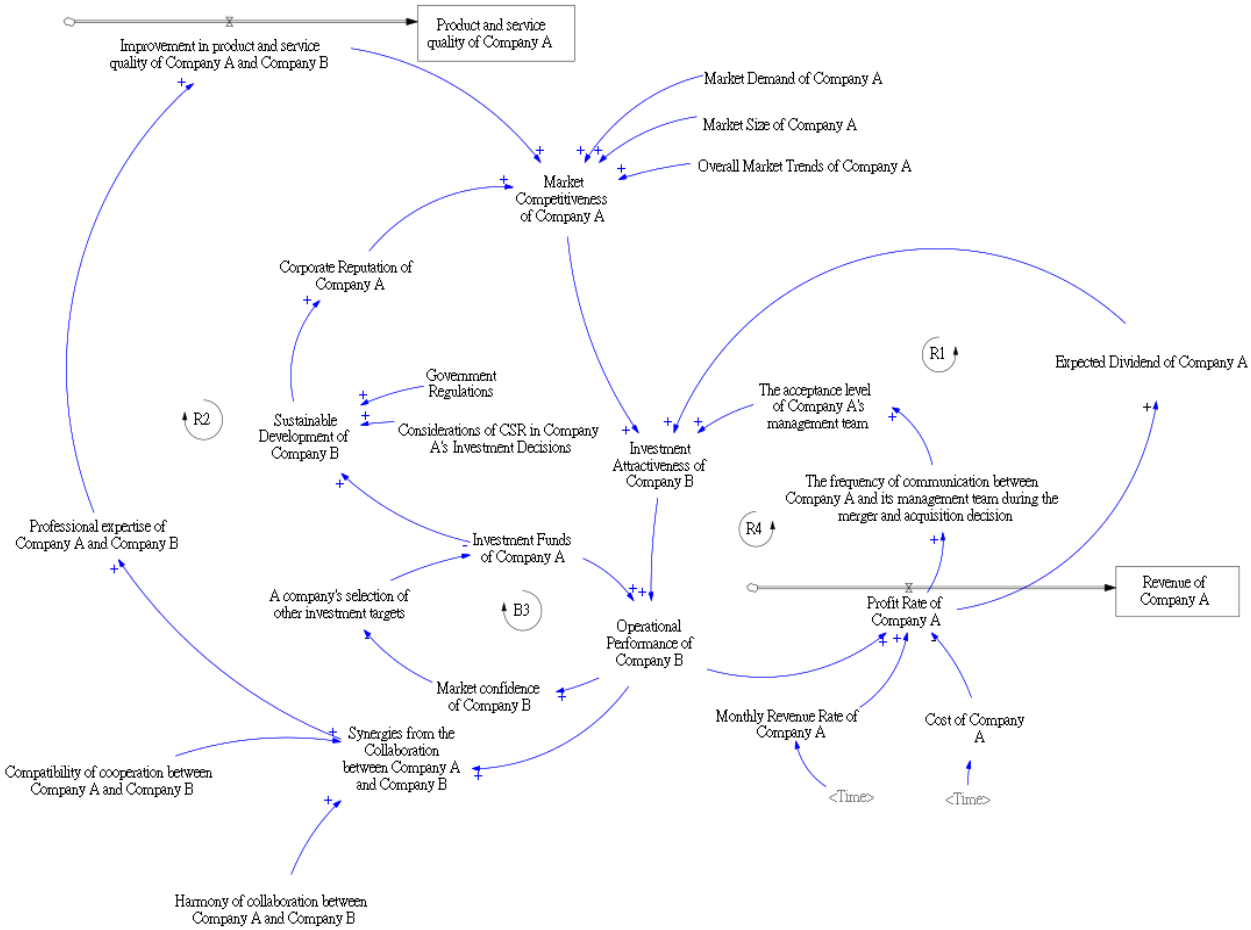

Figure 4. Integrated Feedback Loop Diagram of Internal and External Factors on Acquisition Decisions

4. Simulation Result

4.1. Simulation and Validation

This study constructed a system dynamics model to simulate the revenue of Company A from January 2021 to April 2024 (a total of 40 months). The simulated data was compared with actual historical data to assess the model's accuracy and reliability.

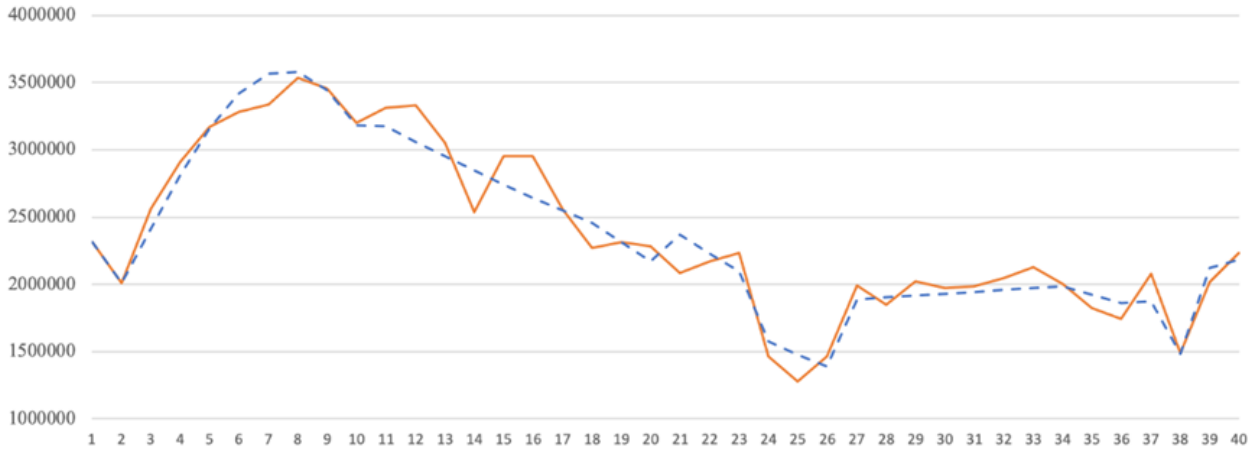

Figure 5. Historical and Simulated Revenue of Company A (Solid line: Historical revenue of Company A; Dashed line: Simulated revenue of Company A. Unit: Thousands of New Taiwan Dollars NTD)

4.2. Model Accuracy Assessment

By calculating the Mean Absolute Percentage Error (MAPE) for all months, we obtained the following value:

$$MAPE = \frac{1}{40}\sum_{t=1}^{40}\left|\frac{A_t - F_t}{A_t}\right| \times 100\% \approx 4.79\% \quad (1)$$

According to Lewis (1982) evaluation standards, a MAPE value of 4.79% indicates high predictive accuracy, as a lower MAPE suggests better precision. This confirms that the model performs well in capturing the effects of market demand, technological advancements, and policy changes on company revenue during the forecast period.

4.3. Scenario Analysis

In this study, we explored the dynamics of the investment behavior of an investment company from January 2021 to April 2024. The focus was on using the system dynamics model to simulate and predict investment decisions when the primary investment target (the acquired company) faced operational difficulties, competitive market conditions, or collaborative synergies, as well as considerations regarding investments in other targets.

4.4. Impact of Market Size Changes on Company A's Revenue

In this scenario analysis, we examine the impact of changes in Company A's market size on its revenue. Assuming a 30% increase in market size, the potential customer base and sales opportunities would expand, leading to revenue growth. Conversely, a 30% decrease in market size could result in fewer potential customers and reduced sales opportunities, thus lowering revenue.

The model indicates that when Company A's market size increases by 30%, its revenue rises in most cases. For instance, in the final month, the revenue under the original market size was 2,185,200. After a 30% increase in market size, revenue reached 2,187,480, reflecting a 0.03% growth. On the other hand, when the market size decreased by 30%, revenue dropped to 2,182,400, a decrease of 0.04%, as shown in Figure 6.

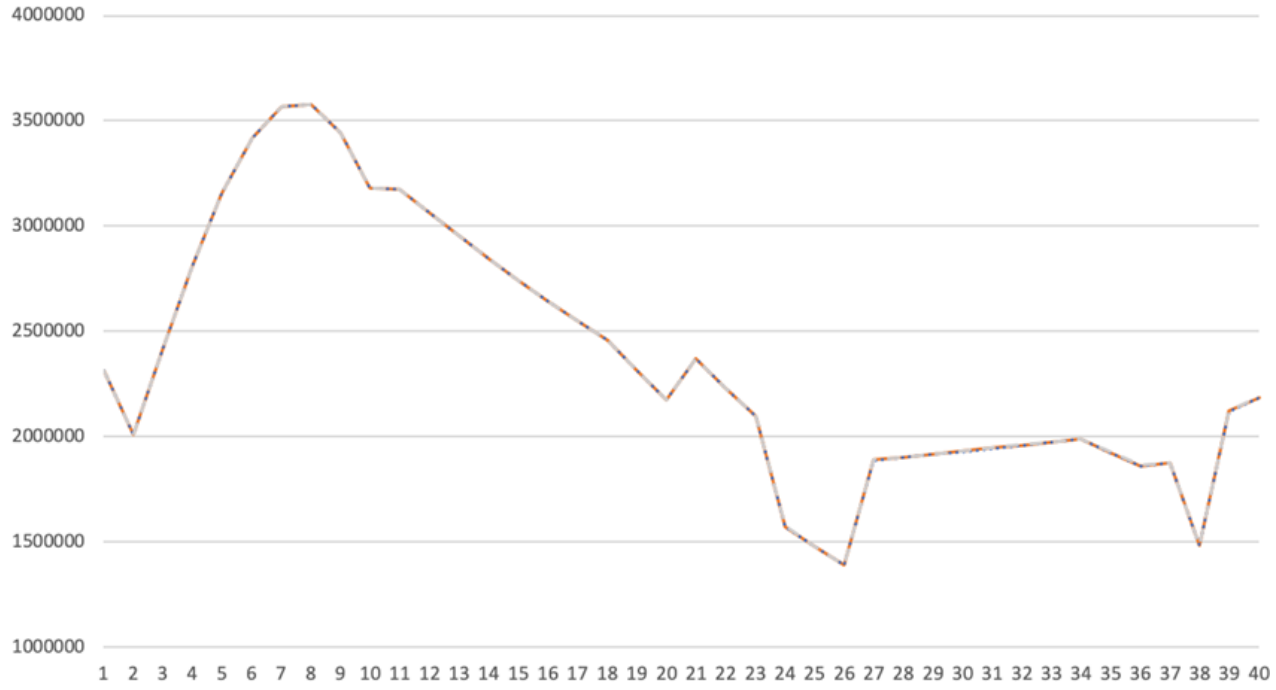

Figure 6. Impact of Market Size Scenario Analysis on Company A's Revenue Solid line (orange): Revenue of Company A under normal market size. Dotted line (blue): Revenue of Company A with a 30% decrease in market size.Dashed line (gray): Revenue of Company A with a 30% increase in market size. Unit: Thousands of New Taiwan Dollars (NTD).

4.5. Impact of Cooperation Harmony on Synergies and Company A's Revenue

This scenario analysis explores how the level of cooperation harmony between Company A and Company B affects synergies. A 30% improvement in cooperation harmony implies smoother communication and closer collaboration between partners, enhancing project outcomes and efficiency, which can boost revenue for Company A. Conversely, a 30% decrease in cooperation harmony could impair communication and weaken the partnership, reducing synergies and affecting Company A's revenue.

The model demonstrates that when cooperation harmony increases by 30%, Company A's revenue generally rises. For example, in the final month, under the original cooperation harmony level, revenue was 2,185,200. When cooperation harmony improved by 30%, revenue increased slightly to 2,185,280, showing a 0.004% growth. Conversely, when harmony decreased by 30%, revenue fell to 2,185,110, a 0.003% decrease, as shown in Figure 7.

Figure 7. Impact of Cooperation Harmony Scenario Analysis on Company A's Revenue Solid line (orange): Revenue of Company A under normal market size.Dotted line (blue): Revenue of Company A with a 30% decrease in market size.Dashed line (gray): Revenue of Company A with a 30% increase in market size. Unit: Thousands of New Taiwan Dollars (NTD).

4.6. Impact of CSR Commitment on Sustainable Development and Company Revenue

This scenario analysis considers the impact of Corporate Social Responsibility (CSR) on sustainable development. Assuming a 30% increase in CSR commitment, such as enhanced investment in environmental protection, social welfare, and employee benefits, a company's social image and sustainable development capabilities would be strengthened, contributing to improved market competitiveness and long-term revenue growth. Conversely, a 30% decrease in CSR commitment could weaken a company's social performance, potentially harming its reputation and sustainable development.

The model shows that with a 30% increase in CSR commitment, Company A's revenue remains unchanged compared to the original level of CSR investment. Similarly, when CSR commitment decreases by 30%, the model also indicates that revenue remains unchanged, contrary to expectations that reduced CSR efforts might negatively impact the company's image and market performance. These results are presented in Figure 8.

Figure 8. Impact of CSR Commitment Scenario Analysis on Company A's Revenue Solid line (orange): Revenue of Company A under normal CSR commitment.Dotted line (blue): Revenue of Company A with a 30% decrease in CSR commitment.Dashed line (gray): Revenue of Company A with a 30% increase in CSR commitment. Unit: Thousands of New Taiwan Dollars (NTD).

5. Managerial Implications

This study conducts an empirical investigation of Taiwan's market environment and employs a system dynamics model to explore the multifaceted internal and external factors influencing high-tech firms during merger and acquisition (M&A) decision-making processes. These factors interact to form complex causal feedback loops, significantly impacting firms' revenues and long-term development. The findings demonstrate the applicability of system dynamics models in M&A decision-making and provide recommendations for improvement.

5.1. Practical Implications

This research highlights the critical role of intangible assets, such as innovation capabilities and management expertise, in M&A decisions. These non-physical assets are often overlooked or undervalued in traditional M&A processes. Through empirical analysis, this study demonstrates their significant influence on firms' long-term competitiveness and market appeal.

Additionally, the study emphasizes the importance of integration during the post-merger phase, particularly regarding cultural compatibility between corporate partners and human resource management. Practical experience indicates that many M&A failures stem from cultural conflicts and the loss of key personnel. By employing system dynamics models, firms can proactively identify and mitigate these risks, enhancing post-merger integration outcomes. This is especially relevant for cross-border and cross-industry M&As, where cultural differences and management challenges are more pronounced.

Incorporating Corporate Social Responsibility (CSR) into the M&A decision-making framework is another key focus. Firms that actively implement CSR strategies, such as reducing carbon emissions and adhering to environmental regulations, not only comply with legal requirements but also attract greater recognition from investors. By adopting adaptive measures under regulatory pressures, companies can reduce future compliance risks and potential cost increases. Moreover, CSR strategies significantly enhance a firm's social image and brand value, attracting socially responsible investment (SRI) funds and increasing investor interest.

Furthermore, the study underscores the importance of improving internal communication, which emerged as a critical finding. Investment departments and management often prioritize different aspects of M&A decisions, creating challenges in the decision-making process. Investors typically seek high-growth, high-potential opportunities, while management tends to focus on stable profitability and risk control. Effective communication can bridge this gap, enabling investment teams to persuade management to accept high-potential yet initially less profitable projects, thereby driving investments in emerging markets and technologies to achieve long-term growth.

Finally, the study provides valuable insights for specific industries in Taiwan, such as the optoelectronics sector, which faces rapid technological changes, intense global competition, and evolving policy environments. Under such circumstances, adopting system dynamics models helps Taiwanese firms more accurately predict market demands and technological trends, effectively manage post-merger integration processes, and maintain a competitive edge in global markets.

5.2. Academic Implications

This study contributes to the field of post-merger integration (PMI). The success of PMI often hinges on effective cultural integration and human resource management, which remain core challenges in M&A management. By employing a system dynamics model, this research reveals the dynamic evolution of cultural integration and emphasizes the temporal interplay of multiple factors. This approach offers a novel methodology for understanding and addressing complex PMI challenges, particularly in cross-cultural or cross-border M&A contexts. Using dynamic modeling, firms can predict and manage potential cultural conflicts and human resource challenges, thereby improving overall M&A success rates.

Moreover, this study integrates CSR into the M&A decision-making framework. While the short-term impact of CSR on firm revenue may be less pronounced than other financial factors, its long-term effects on reputation and brand value offer significant potential for value creation. The findings demonstrate that incorporating CSR considerations into M&A decisions helps firms establish and sustain long-term competitive advantages in highly competitive markets. This integration broadens the scope of M&A decision-making research and provides a new perspective for future studies.

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