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A System Dynamics Approach To Modeling Brand Awareness Growth In MSME Digital Marketing: The Case Of Manoki Koe

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Abstract

Increasing brand awareness is an important aspect for MSMEs that use social media as a digital marketing medium. However, the growth of brand awareness is not determined only by promotional intensity. It is also shaped by the relationship among user reach, content impressions, engagement, content algorithms, reinvestment capacity, and consumer saturation. This study aims to analyze the dynamics of brand awareness growth for Manoki Koe MSME products using a system dynamics approach. The model was developed through a causal loop diagram and a simulation for the 2025-2035 period. The simulation results show that user reach, content impressions, engagement, reinvestment capacity, promotional costs, and algorithmic support increased at the beginning of the period, but then declined in the following years. In contrast, consumer saturation tended to increase. These findings indicate that Manoki Koe's digital marketing strategy should not only focus on increasing promotion, but also on content creativity, the quality of engagement, algorithm optimization, reinvestment management, and control of consumer saturation. Thus, the system dynamics approach can help MSMEs understand the behavior of brand awareness over time and design a more adaptive and sustainable digital marketing strategy.

Keywords: brand awareness, engagement, MSMEs, social media, system dynamics.

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INTRODUCTION

The value of digital marketing growth in Indonesia reached IDR 1,635 trillion in 2025. This condition creates both opportunities and challenges for MSMEs to remain relevant in the global market (Marketing and Communications, 2025). The adoption of digital platforms by MSMEs provides positive impacts in several aspects, such as broader consumer reach, closer connections with consumers through the internet, more flexible transaction processes, and stronger brand awareness (Andriani et al., 2020). Strengthening MSME competitiveness through brand awareness can be achieved by optimizing promotional effectiveness and developing interaction with consumers (Bergkvist and Taylor, 2022).

Promotion through digital platforms makes it easier for MSME actors to monitor the needs and preferences of potential consumers. In addition, digital marketing enables MSMEs to reach potential consumers without geographical and time limitations (Thaha et al., 2021). Abbas and Muin (2025) explain that wider content reach will increase the number of impressions. Appropriate frequency and reach make consumers more familiar with a product and may encourage purchase decisions. Furthermore, Syahid and Setyawan (2025) emphasize that an increase in impressions reflects the early stage of promotional strategy effectiveness in attracting consumer attention. This becomes an important factor in improving business performance.

An increase in impressions indicates that content appears more often on users' feeds and reaches a wider audience. However, post-impression interaction is also important for observing the active involvement of the audience, such as giving likes, writing comments, sharing posts, or performing other forms of interaction. Philip Kotler and Kevin Lane Keller (2022) highlight the importance of engagement in building strong relationships with customers. Engagement is not only about gaining attention, but also about creating continuous and meaningful interaction with audiences. In line with this view, Sundari et al. (2026) state that persuasive communication contained in promotional content can increase engagement and strengthen the sense of connection between audiences and the brand.

Audience involvement affects how social media platforms read the quality of content. Content that receives many responses is considered relevant to audiences and may increase engagement (Dekker et al., 2025). Chung (2025) also explains that algorithms select and manage content based on user behavior, such as clicks, likes, shares, and viewing history. Based on this explanation, algorithms are important to

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discuss because audience responses captured by platform systems determine the effectiveness of promotional content in building brand visibility in the market.

Algorithms, engagement, and brand awareness are closely related. Algorithms tend to provide wider distribution space for content that receives high responses. Meanwhile, engagement shows that audiences pay attention and respond to the information delivered. In this regard, brand awareness is formed through repeated exposure strengthened by audience interaction and platform distribution mechanisms. In line with the findings of Bazi et al. (2023) and Fauzi and Sarasati (2025), customer engagement is an indicator of successful brand visibility on social media. The higher the engagement of a piece of content, the greater the opportunity for algorithms to expand its reach, which ultimately strengthens consumer awareness of the brand (Setiawan and Fadre, 2025).

In the MSME context, brand awareness contributes to increased brand recognition, trust, visibility, customer acquisition, and customer retention (Sumartini, 2024; Muchori and Reid, 2025). Brand awareness becomes a driving factor for increasing purchase intention and expanding consumer reach. If this is followed by increased sales, MSMEs have the potential to gain additional revenue, which can then improve reinvestment capacity for allocating resources back into business development activities.

A similar phenomenon was found in Manoki Koe, an MSME that began using social media to promote its products in 2025. Several uploaded videos and photos reached audiences and increased content impressions. Although engagement was still limited, Manoki Koe attempted to upload content that followed the latest trends, so that the algorithm could read the content as interesting and relevant. This effort was made to increase brand awareness of Manoki Koe products and, in turn, improve sales.

The causal relationships among promotion, user reach, content impressions, engagement, algorithms, brand awareness, and reinvestment are illustrated through the causal loop diagram presented in Figure 1. The diagram shows how brand awareness of Manoki Koe MSME products is influenced by reinforcing and balancing feedback mechanisms. The reinforcing loops explain how promotion, reach, impressions, engagement, and reinvestment can continuously support brand awareness growth. Meanwhile, the balancing loop explains how consumer saturation can reduce engagement and limit further growth.

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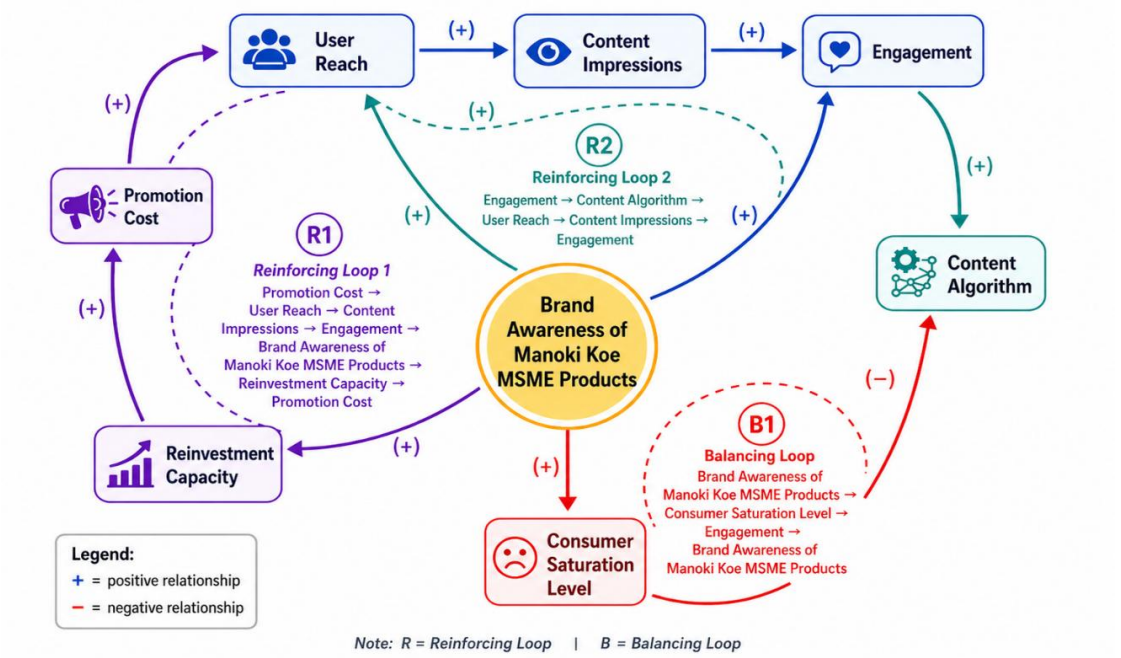


Figure 1. Causal Loop Diagram of Brand Awareness for Manoki Koe MSME Products

Based on Figure 1, there are two reinforcing loops and one balancing loop. The first reinforcing loop, R1, describes the relationship among promotional costs, user reach, content impressions, engagement, brand awareness, reinvestment capacity, and promotional costs. This loop shows that higher promotional costs can increase user reach, which then increases content impressions and engagement. Higher engagement strengthens brand awareness, and stronger brand awareness increases reinvestment capacity. As a result, the business can allocate more resources for promotion in the following period.

The second reinforcing loop, R2, explains the interaction among engagement, content algorithms, user reach, content impressions, and engagement. When engagement increases, content algorithms are more likely to distribute content to a wider audience. As user reach and content impressions increase, engagement may also increase. This loop emphasizes the importance of creating relevant, attractive, and interactive content to maintain algorithmic visibility and consumer participation.

In contrast, the balancing loop, B1, shows the relationship among brand awareness, consumer saturation level, and engagement. Although higher brand

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awareness can increase product visibility, excessive exposure to similar content may increase consumer saturation. Baj-Rogowska (2022) and Chebbi (2025) confirm that repeated exposure to content can cause social media fatigue. This condition encourages audiences to avoid advertisements and may reduce engagement.

Referring to the relationship among these variables, understanding the causal loop structure becomes important as a basis for designing a sustainable digital marketing strategy for Manoki Koe. Every promotional decision can affect user reach, content impressions, engagement, algorithms, and the formation of brand awareness. However, the risk of audience saturation caused by repeated content exposure also needs attention. Therefore, by identifying reinforcing and balancing mechanisms, MSME managers can observe which variables should be strengthened and which risks should be controlled. This understanding is also useful for estimating the future direction of brand awareness. Based on this view, this study aims to analyze the dynamic relationship between social media performance indicators and brand awareness of Manoki Koe products through a causal loop approach, and to simulate the dynamics of brand awareness growth for the 2025-2035 period.

RESEARCH METHOD

This study uses a system dynamics approach to analyze the growth of brand awareness for Manoki Koe MSME products. This approach was selected because brand awareness is influenced by several interrelated variables that change over time.

The main variables in this study include promotional costs, user reach, content impressions, engagement, content algorithms, reinvestment capacity, consumer saturation, and brand awareness. The relationships among these variables were arranged in the form of a causal loop diagram to identify reinforcing and balancing mechanisms in Manoki Koe's digital marketing system.

The model consists of two main patterns. The first is a reinforcing loop, in which promotional costs increase user reach, reach increases content impressions, impressions encourage engagement, and engagement strengthens brand awareness. Increased brand awareness can then enlarge reinvestment capacity to support the next promotional activities.

The second is a balancing loop, in which repeated exposure to content can increase consumer saturation. This saturation may reduce engagement, which then slows the growth of brand awareness.

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After the model was developed, a simulation of brand awareness growth dynamics was conducted for the 2025-2035 period. The simulation results were analyzed descriptively by observing changes in each variable over time. The analysis focused on how promotion, digital visibility, engagement, algorithms, reinvestment, and consumer saturation affect the growth of brand awareness for Manoki Koe MSME products.

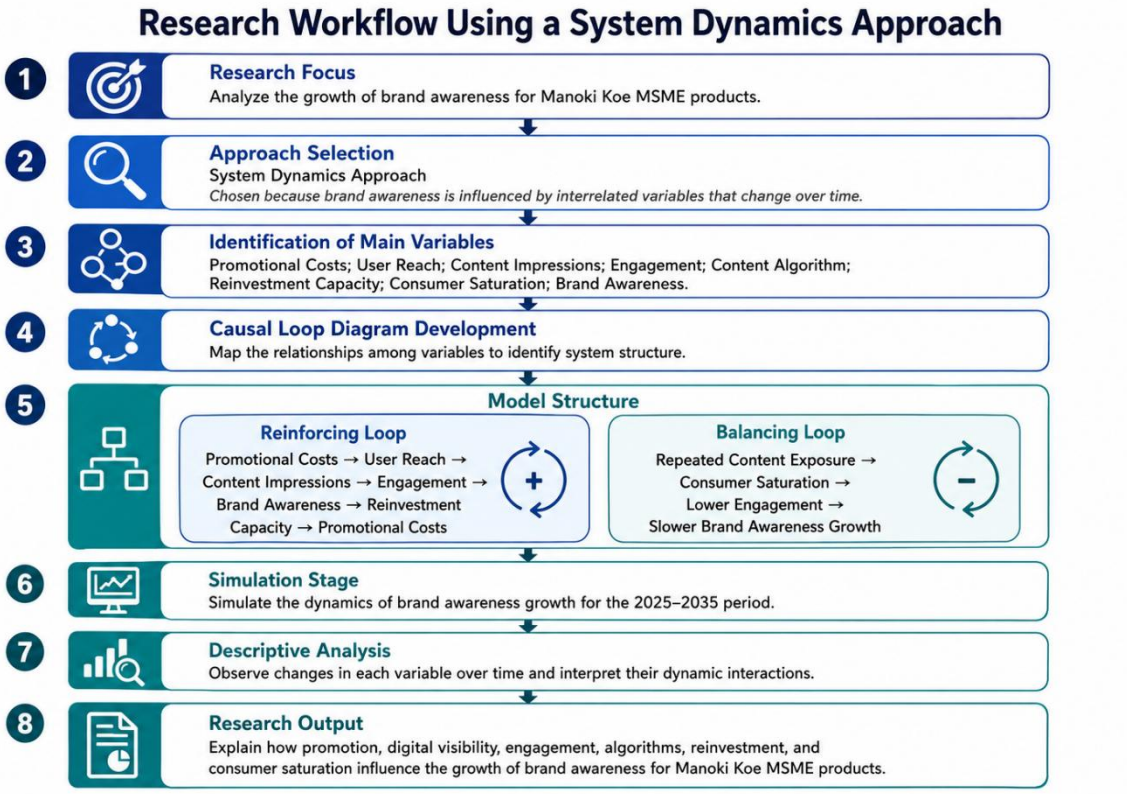


Figure 2. Research Workflow of The System Dynamics Model for Brand Awareness Growth

DISCUSSION

The simulation results show that the dynamics of brand awareness growth for Manoki Koe MSME products are influenced by interactions among social media performance variables, namely user reach, content impressions, engagement, reinvestment capacity, promotional costs, consumer saturation level, and content algorithms. These variables do not work separately. They are connected through a feedback structure that forms a dynamic system. Trunfio and Rossi (2021) also

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emphasize that interrelationships among variables shape social media performance. Therefore, brand awareness does not grow only from the number of uploads, but from a combination of social media activities, such as the interaction between promotional activities, consumer responses, algorithmic exposure, and financial reinvestment capacity (Malarvizhi et al., 2022).

The dynamic system structure used in this study is presented in Figure 3. The diagram describes the causal mechanism of brand awareness growth through several connected variables. Promotional costs affect user reach because higher promotional spending can increase the number of potential consumers exposed to Manoki Koe's social media content. This finding is supported by Liu et al. (2025), who state that advertising or promotional investment can expand user reach. User reach then affects the number of content impressions, while content impressions affect engagement. Engagement is an important variable because it reflects consumer interaction with content and affects brand equity (Lee and Park, 2022).

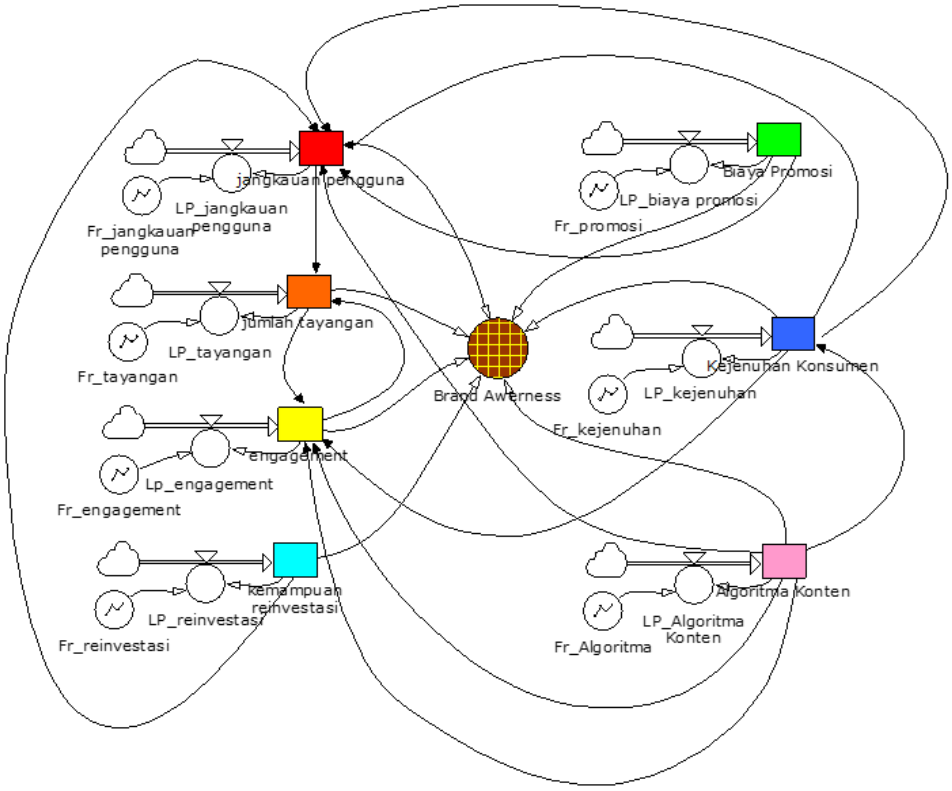


Figure 3. Dynamic Flow Diagram of Brand Awareness Growth for Manoki Koe MSME Products

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As shown in Figure 3, engagement plays a central role in strengthening brand awareness. When engagement increases, content visibility can also improve because social media algorithms tend to prioritize content that receives high interaction. This creates a reinforcing mechanism: engagement supports content algorithms, algorithms increase user reach, and greater user reach increases content impressions. In turn, content impressions may again increase engagement. This feedback structure shows that the success of digital marketing is not determined only by the size of promotional costs, but also by content quality and the ability to generate consumer interaction. This is in line with Rini (2022), who states that digital marketing success is supported by content quality that can encourage consumer involvement.

Furthermore, Figure 3 also shows the role of reinvestment capacity in supporting the sustainability of brand awareness growth. Higher brand awareness can increase business opportunities and improve the capacity of MSMEs to reinvest in promotional activities. Reinvestment capacity enables Manoki Koe to improve content quality, increase promotional costs, optimize digital advertising, and maintain consistency in social media activities. Therefore, reinvestment capacity becomes an important variable in maintaining brand awareness growth over time. It needs to be carried out continuously so that brand awareness does not stop in only one campaign period (Kim, 2021).

However, this model also includes consumer saturation as a limiting factor. Consumer saturation represents a condition in which consumers become less responsive due to repeated exposure to similar content or promotional messages. When consumer saturation increases, engagement may decrease. This condition creates a balancing mechanism that can slow the growth of brand awareness. Thus, although promotion and engagement can strengthen brand awareness, excessive exposure without content variation can reduce consumer interest. Paramesti et al. (2025) also emphasize the importance of managing content frequency, relevance, and intrusiveness so that engagement can be maintained.

The numerical simulation results of the dynamic model are presented in Figure 4. The simulation was conducted for the 2025-2035 period to observe the behavior of each variable over time. The table shows that several variables experienced an initial increase in 2026, but then gradually declined in the following years. User reach increased from 132,228.00 in 2025 to 149,325.08 in 2026, but continued to decline to 73,293.39 in 2035. A similar pattern was found in content impressions, which increased from 53,208.00 in 2025 to 59,587.64 in 2026, before declining to 30,229.04 in 2035.

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year	jangkauan pengguna	jumlah tayangan (Tayangan)	engagement	kemampuan reinvestasi (Rupiah)	Biaya Promosi (Rupiah)	Kejenuhan Konsumen	Algoritma Konten
2,025	132,228.00	53,208.00	348.00	3,000,000.00	3,000,000.00	43.00	126.00
2,026	149,325.08	59,587.64	397.10	3,635,700.00	3,030,600.00	43.38	131.03
2,027	168,632.81	66,738.16	453.01	2,858,387.34	3,060,299.88	42.99	136.26
2,028	146,818.47	58,720.90	387.83	2,244,377.16	3,029,941.71	43.38	130.82
2,029	127,823.10	51,669.11	332.64	1,763,900.89	2,999,581.69	43.78	125.60
2,030	111,218.88	45,468.82	285.80	1,383,780.25	2,969,285.91	44.17	120.58
2,031	96,760.42	39,998.92	245.33	1,082,254.53	2,938,999.20	44.57	115.77
2,032	85,333.02	35,194.65	208.25	841,020.00	2,910,255.79	45.01	111.15
2,033	81,134.63	33,463.07	202.17	832,778.00	2,570,046.88	45.42	100.73
2,034	77,118.47	31,806.65	196.41	824,533.50	2,269,608.40	45.83	91.29
2,035	73,293.39	30,229.04	190.63	816,288.17	2,004,291.18	46.24	82.74

Figure 4. Simulation Table of Brand Awareness Growth Dynamics for the 2025-2035 Period

The simulation results in Figure 4 show that the initial increase in user reach and content impressions was followed by a decline in the following years. This pattern indicates that initial promotion and algorithmic support can be effective in increasing digital visibility, but their influence tends to weaken over time if the business does not maintain content innovation and audience engagement. The decline in user reach and content impressions indicates that the digital visibility of Manoki Koe MSME products may decrease when promotional effectiveness, algorithmic support, and consumer interaction are not continuously strengthened. In this regard, Chandra and Sulubara (2026) state that digital marketing effectiveness can be improved through data analytics, publication scheduling, advertising segmentation, and two-way interaction.

Engagement also shows a similar trend. In 2025, engagement was 348.00 and increased to 397.10 in 2026. In 2027, engagement reached its highest point at 453.01. However, after 2027, engagement decreased to 387.83 in 2028 and continued to decline to 190.63 in 2035. This decline indicates that consumer interaction weakened over time. One possible explanation is the increasing level of consumer saturation, which rose from 43.00 in 2025 to 46.24 in 2035. Increased consumer saturation can reduce audience interest and responsiveness to social media content.

The trend of reinvestment capacity also shows an important finding. Reinvestment capacity increased from IDR 3,000,000.00 in 2025 to IDR 3,635,700.00 in 2026. However, after 2026, reinvestment capacity declined significantly to IDR 2,858,387.34 in 2027, IDR 2,244,377.16 in 2028, and continued to decline to IDR 816,288.17 in 2035. This result shows that Manoki Koe's ability to reinvest in promotional activities weakened over time.

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A decline in reinvestment capacity can reduce the ability to maintain promotional costs, improve content quality, and strengthen digital marketing activities.

Promotional costs also showed a declining trend after a relatively stable period. In 2025, promotional costs amounted to IDR 3,000,000.00 and increased slightly to IDR 3,030,600.00 in 2026. Promotional costs continued to increase to IDR 3,060,299.88 in 2027, but then gradually declined to IDR 2,004,291.18 in 2035. This indicates that promotional resources become increasingly limited in the long term. Because promotional costs affect user reach, a decline in promotional costs can contribute to reduced user reach and content impressions.

The content algorithm variable also declined after reaching its peak in 2027. The algorithm value increased from 126.00 in 2025 to 131.03 in 2026 and 136.26 in 2027. However, the value declined to 130.82 in 2028 and continued to decrease to 82.74 in 2035. This result shows that algorithmic support for Manoki Koe content weakened over time. The decline in content algorithm performance may be related to lower engagement and higher consumer saturation. When engagement decreases, algorithms may provide lower exposure to content, thereby reducing user reach and content impressions.

The graphical simulation results are presented in Figure 5. This figure provides a clearer visualization of the dynamic behavior of each variable during the 2025-2035 period. The graph shows that most variables, including investment capability, content algorithms, user reach, content impressions, engagement, and promotional costs, experienced an increasing trend at the beginning of the simulation period, but then declined in the following years. In contrast, consumer saturation showed an increasing trend, especially after 2027.

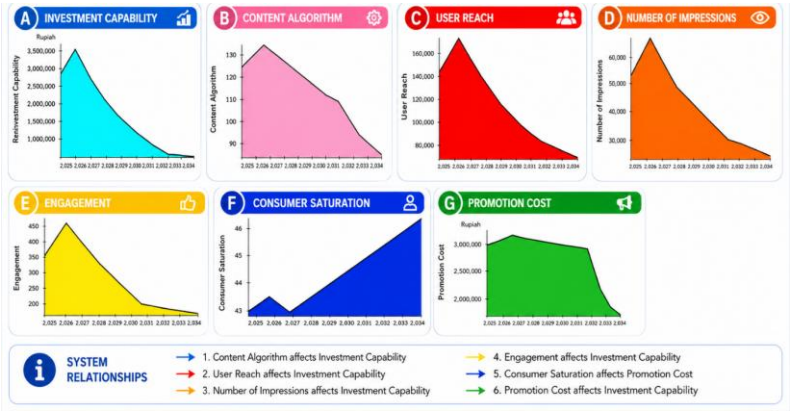


Figure 5. Simulation Results of Brand Awareness Growth Dynamics for the 2025-2035 Period

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As shown in Figure 5, investment capability increased at the beginning of the period and reached its highest point in 2026. However, after that, investment capability declined sharply. This condition shows that the initial increase in brand awareness can provide a temporary improvement in business reinvestment capacity, but this capacity cannot be maintained when engagement and digital visibility decline. A decrease in investment capability also affects the ability to finance promotional activities, which then reduces user reach and content impressions. Sudirjo et al. (2025) emphasize that the use of a social media advertising budget can increase brand exposure, consumer awareness, engagement, and MSME sales conversion.

The graphs of user reach and content impressions also confirm the results shown in the simulation table. Both variables increased in the early period, but then continued to decline. This indicates that the exposure of Manoki Koe MSME products on social media decreased over time. In digital marketing, a decline in user reach and content impressions can reduce the opportunity for potential consumers to recognize the brand. Therefore, maintaining digital visibility is an important part of building and sustaining brand awareness (Dwivedi et al., 2021; Alicia and Sugianto, 2026).

The engagement graph shows a strong decline after reaching its peak in 2027. This decline is important because engagement is one of the most influential variables in the model. Engagement affects brand awareness and also affects content algorithms. In line with Chairani (2025), who states that engagement, algorithms, and content impressions are interrelated, when engagement decreases, algorithmic content distribution may weaken, causing a further decline in user reach and content impressions. This result shows that engagement should be treated as a strategic priority in managing Manoki Koe's social media performance.

The graph of consumer saturation shows an opposite pattern compared with the other variables. When most variables decline, consumer saturation increases over time. This supports the balancing loop mechanism in the model. When consumers become increasingly saturated, engagement decreases. This finding indicates that repeated promotional content without adequate variation can reduce consumer interest. Therefore, Manoki Koe needs to avoid monotonous content and develop a more varied, creative, and interactive digital marketing strategy. Kamal et al. (2025) also state that brand awareness and engagement can be improved through creative, varied, and interactive content marketing strategies.

The graph of promotional costs also shows a decline after the initial period. This decline may limit Manoki Koe's ability to maintain user reach and content impressions.

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However, increasing promotional costs alone is not enough to improve brand awareness if consumer saturation is not controlled. Promotion must be combined with content innovation, audience segmentation, and data-based evaluation. This means that promotional spending should be directed toward strategies that produce meaningful engagement, not merely higher exposure (Liu et al., 2025).

Based on the three figures, it can be concluded that the dynamics of brand awareness growth for Manoki Koe MSME products are formed by reinforcing and balancing mechanisms. The reinforcing mechanism occurs when promotional costs increase user reach, user reach increases content impressions, content impressions increase engagement, and engagement strengthens brand awareness. Higher brand awareness can then increase reinvestment capacity and support promotional activities in the next period. However, this reinforcing mechanism weakens when engagement declines and reinvestment capacity decreases.

Meanwhile, the balancing mechanism occurs through consumer saturation. The simulation results show that consumer saturation gradually increased from 2025 to 2035. This increase in saturation reduces engagement and weakens brand awareness growth. Therefore, consumer saturation becomes one of the most important constraints in the system. If this variable is not managed properly, the effectiveness of social media marketing will continue to decline even though promotional costs are still allocated.

This discussion also shows that the most critical variables in the model are engagement, content algorithms, and consumer saturation. Engagement acts as the main driver of brand awareness and algorithmic visibility. Content algorithms determine how widely content is distributed to users. On the other hand, consumer saturation acts as a limiting factor that reduces engagement. Therefore, Manoki Koe needs to focus on maintaining engagement while controlling consumer saturation.

From a managerial perspective, the simulation results provide several strategic implications. First, Manoki Koe needs to improve content innovation by creating more diverse content, such as product storytelling, customer testimonials, educational content, behind-the-scenes production processes, promotional campaigns, and interactive posts. Second, audience segmentation needs to be strengthened to ensure that content is delivered to the most relevant target consumers. Third, post variation is needed to prevent consumer boredom and reduce saturation. Fourth, analytics-based promotion should be implemented to evaluate which content has the best performance and which audience segments provide the most positive responses.

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In addition, Manoki Koe needs to use reinvestment capacity more strategically. Reinvestment should not only be directed toward increasing promotional costs, but also toward improving content quality, strengthening social media management, and developing digital marketing skills. Thus, the business can increase engagement and strengthen algorithmic visibility. This strategy can help slow the decline in user reach, content impressions, and engagement.

Overall, the simulation results confirm that brand awareness growth is a dynamic process. This growth is influenced by the interaction among promotional resources, digital visibility, consumer engagement, algorithmic support, reinvestment capacity, and consumer saturation. The decline of several variables after the initial simulation period indicates that Manoki Koe needs to develop a more sustainable digital marketing strategy. This strategy should not only focus on promotional intensity, but also on content creativity, engagement quality, and consumer response management. Setiawan and Fadre (2025) and Lita et al. (2026) also emphasize that the success of a digital strategy should be viewed from its ability to build consumer interaction, not merely from its ability to increase exposure.

Therefore, the system dynamics approach used in this study provides a useful framework for understanding the behavior of brand awareness over time. Through the interpretation of Figures 3, 4, and 5, it can be seen that the growth of brand awareness for Manoki Koe MSME products is not determined only by the amount of promotional costs. It is also determined by the ability to maintain engagement, optimize content algorithms, manage reinvestment capacity, and reduce consumer saturation. These findings emphasize the importance of adaptive and data-based digital marketing strategies for MSMEs in the social media era.

CONCLUSION

The results of this study show that the growth of brand awareness for Manoki Koe MSME products is a dynamic process. This growth is not only influenced by promotional costs, but also by user reach, content impressions, engagement, content algorithms, reinvestment capacity, and consumer saturation.

The simulation for the 2025-2035 period shows that several variables increased at the beginning of the period, especially user reach, content impressions, engagement, promotional costs, reinvestment capacity, and algorithmic support. However, after the initial period, most of these variables declined. This condition indicates that initial

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promotion can improve digital visibility, but its effect does not always last if it is not supported by content innovation and continuous engagement management.

Consumer saturation becomes a limiting factor in the system. When consumers receive similar content too often, their response to content may decline. This affects the weakening of engagement and reduces algorithmic support for content distribution. Therefore, Manoki Koe needs to develop a more adaptive, creative, and interactive digital marketing strategy. This strategy can be carried out through content variation, product storytelling, customer testimonials, educational content, interactive promotion, and data-based evaluation of social media performance. Reinvestment capacity also needs to be directed not only toward increasing promotional costs, but also toward improving content quality and social media management.

In general, the system dynamics approach provides a useful framework for understanding the behavior of brand awareness over time. This model helps show that the success of MSME digital marketing does not depend only on promotional intensity, but also on the ability to maintain engagement, optimize algorithms, manage reinvestment, and reduce consumer saturation.

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