

# Integrating Instagram Analytics into Information Systems: Enhancing Pastry Sales Through Seasonal and Non-Festive Engagement Insights

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**Abstract**—This study investigated the integration of Instagram analytics into the information systems used by MSMEs in the pastry industry, with a focus on engagement trends. Using a descriptive quantitative approach, the research identifies a benchmark engagement rate of 16.5%, calculated from the midpoint between peak festive engagement and regular-day averages. Findings show a sharp increase in engagement leading up to Eid, exceeding the benchmark, followed by a noticeable decline post-event. In contrast, regular day engagement remains consistently below the benchmark. These patterns highlight the impact of cultural events on consumer behavior and the difficulty of sustaining interest afterward. The study concludes that integrating social media data into enterprise systems enables MSMEs to optimize marketing strategies and time promotions more effectively and respond better to seasonal trends, offering a practical model for data-driven decision-making in small businesses.

**Keywords:** Consumer Behavior Analysis, Data-Driven Decision Making, Information Systems Integration, Instagram Engagement Metrics, Social Media Analytics

## I. INTRODUCTION

Micro, Small, and Medium Enterprises (MSMEs) were the backbone of Indonesia's economy, especially in the food sector. These businesses played a vital role in producing and distributing pastries, a key product during festive and non-festive seasons alike. Small businesses often struggled to sell consistently due to high competition and limited resources, especially when customer interest varied. To thrive, these businesses had to adopt innovative strategies that not only enhanced their competitiveness but also leveraged technology for operational efficiency and customer engagement [1].

To address these challenges, many MSMEs had turned to social media marketing, with Instagram emerging as a particularly effective platform. Its visually appealing design, engagement-driven algorithms, and support for influence partnerships provided businesses with tools to attract and retain customers [2]. By leveraging Instagram analytics, businesses could gain valuable insights into customer engagement metrics such as likes, comments, shares, and saves, which helped refine

marketing strategies and improve campaign effectiveness [3]. These analytics, when integrated into broader information systems, enable MSMEs to monitor consumer behavior, optimize operations, and make data-driven decisions that enhance their competitiveness.

Eid Al-Fitr, one of the most significant religious celebrations for Muslims, presents a unique opportunity for MSMEs. The festive period is marked by increased consumer spending, particularly on pastries, as part of gift-giving traditions and family gatherings [1]. During this time, MSMEs often experience a surge in sales, but maintaining momentum after the festive season remains a significant challenge. Understanding how Instagram engagement influences consumer behavior during and after Eid could provide food businesses with actionable insights for crafting more effective digital marketing campaigns. Additionally, the integration of social media analytics into enterprise information systems offers a comprehensive approach to managing seasonal trends, improving decision-making, and sustaining sales throughout the year.

This study explored the role of Instagram analytics within MSME information systems, focusing on their application during the Eid al-Fitr period compared to regular periods. By examining consumer engagement patterns and their impact on purchasing behavior, the research aimed to offer practical recommendations for leveraging social media analytics to drive business growth and maintain post-festive momentum.

Numerous studies have investigated how social media affected the expansion of food businesses, particularly in terms of customer interaction and sales outcomes [4]. Research on social media analytics had shown that platforms like Instagram improved consumer interaction at little to no cost, making it a valuable tool for MSMEs seeking broader market reach. Moreover, small businesses were able to maximize the effectiveness of their digital marketing efforts by utilizing advanced social media analytics tools [5]. By leveraging social media audiences, businesses refined their marketing strategies, built stronger connections with their audience, and increased brand recognition [6]. Furthermore, a study by Nadda et al. emphasized the critical role of social media in brand positioning and consumer trust-building. Their analysis underscored how consistent online presence, interactive content, and customer feedback contributed to shaping a brand's identity and fostering long-term customer relationships [7]. This growing reliance on social media platforms demonstrates their effectiveness as a cost-efficient and impactful marketing tool in the food industry [8].

In terms of social media, Instagram was one of the most widely used platforms, with 1.44 billion users by the start of 2025. Additionally, Instagram served as an effective platform that provided various tools to support marketing efforts [9]. Compared to other social media platforms, Instagram proved more effective for business marketing, particularly due to its emphasis on brand engagement and content quality [10]. Moreover, Instagram successfully expanded and enhanced marketing communication functions, allowing small businesses to reach potential consumers and

achieve their objectives [11]. In addition, the selected tools that Instagram provide such as likes, comments, shares, saves, and tags boost the user engagement in buying the products [12]. Therefore, Instagram had strong potential as a social media platform that could be utilized to improve marketing strategies.

Social media analytics applies for the strategic decision-making for the growth of MSMEs. The further analysis provided by social media proved effective in making business decisions, achieving higher competitive results with greater accuracy, system dependency, and measurement [13]. The data provided also enhanced organizational innovation and adaptability, positively impacting strategic decision-making [14]. Similarly, social media analytics enhanced business performance by offering valuable insights for informed decision-making and targeted marketing strategies [15].

Leveraging social media was essential to enhancing the performance of MSME business growth [16]. Social media positively impacted the performance of MSMEs by allowing consumers to easily connect with new products, services, and brands [17]. Additionally, social media marketing increased MSME sales, strengthened customer relationships, and boosted productivity and creativity [18]. Social media was also utilized as a marketing communication tool to enhance the competitiveness and sales of MSMEs [19]. Therefore, it was crucial for MSMEs to use social media to support their business development.

Further research explored the impact of social media on consumer buying patterns. A study by Rachmad highlighted that social media's influence on consumer behavior had been widely examined, particularly in how marketing efforts shaped purchasing decisions [20]. Moreover, social media affected customers' purchasing behavior by increasing their engagement and willingness to buy certain products [21]. Furthermore, there was a discernible increase in consumer spending during seasonal events, which elevated purchasing power and altered buying patterns.

An analysis by Purnomo showed that social media interaction significantly influenced consumer behavior toward MSME products before Eid Al-Fitr, with factors such as content type, posting frequency, user interaction, and visual content quality playing essential roles [22]. Moreover, there was a noticeable increase in consumer spending during seasonal events, which elevated purchasing power and altered purchasing patterns. MSMEs had a valuable opportunity to leverage social media marketing during these periods by aligning their campaigns with seasonal occasions to boost engagement and revenue [23].

Despite the benefits of social media marketing, MSMEs faced several challenges in leveraging Instagram effectively. Small businesses possibly encountered difficulties in seeking feedback due to limited access to certain audience segments on social media [24]. Moreover, although these businesses engaged easily with customers, they still struggled to create lasting brand engagement [25]. In addition, the lack of control over social media use remained a challenge for small businesses in fully utilizing these platforms for business growth [26].

This study aimed to examine how Instagram analytics influenced the sales performance of MSMEs specializing in Eid pastries, with particular attention to user engagement metrics and consumer purchasing behavior. It also sought to explore how small businesses could strategically utilize Instagram as a marketing tool to strengthen brand visibility and build customer trust. In addition, the research identified the key challenges faced by MSMEs in leveraging social media for business expansion and offered potential solutions to help optimize their online marketing efforts.

This engagement metric was crucial for examining patterns and trends over time, as it captured how audience interaction evolved, allowing for correlation with other important variables, such as sales performance. By applying this standardized metric, businesses and organizations gained valuable insights into the effectiveness of their social media strategies. Once organized into tables and presented through comparative graphs, these

insights helped illustrate how varying levels of user engagement directly influenced purchasing behaviors, providing actionable data for MSMEs to refine their marketing strategies on social media platforms.

## II. RESEARCH METHODS

This study adopted a quantitative descriptive research approach to examine the influence of Instagram engagement metrics on consumer purchasing behavior, particularly in the context of seasonal sales surrounding the Eid Al-Fitr celebration. Descriptive statistical analysis was employed to identify trends, patterns, and correlations between user interactions and purchasing decisions on a small business's Instagram platform [27]. This method was suitable for social media research, as it presented data in a clear and interpretable manner without requiring complex modeling or predictive techniques [28]. Additionally, descriptive statistical analysis proved effective in visualizing user engagement trends over time, making it easier to interpret how marketing strategies influenced consumer behavior [29].

### 2.1 Data Collection

The subject of this research was an Instagram business account referred to as *PastriesToGo*, which specialized in festive and seasonal pastries, particularly those themed for cultural celebrations such as Eid Al-Fitr. The business was selected based on several key criteria. *PastriesToGo* sold handmade pastries directly through Instagram and operated solely through organic engagement, without relying on paid advertisements or influencer collaborations. The account maintained a consistent content output featuring visually appealing product images, engaging captions, and regular use of Instagram features such as stories, reels, and feed posts. During the research period, the account had a follower base of at least 300 users, representing a modest but engaged audience. The business also demonstrated a steady and professional approach to marketing by incorporating customer testimonials, countdown posts, and

behind-the-scenes content into its promotional strategy.

Data collection was conducted over a period of 14 days, divided into two key timeframes. The first timeframe, from March 24 to March 30, 2025, represented the pre-Eid period, capturing consumer behavior leading up to the holiday. The second timeframe, from April 1 to April 7, 2025, covered the post-Eid period, allowing the researcher to observe any significant changes in engagement and purchasing patterns after the celebration. For comparative purposes, the study also included a non-festive reference period from February 1 to February 7, 2025, and the second week which was from 9 February to 15 February 2025 which provided a baseline for analyzing consumer interaction and sales performance outside of holiday-related influences.

Throughout each phase of observation, *PastriesToGo* maintained a posting frequency of three posts per day. The content strategy remained consistent in tone and format, ensuring reliability in data collection. The variables measured daily included the total number of likes, comments, shares, and saves, along with the number of confirmed purchases made through direct messages and follow-up transactions. This research extracted these metrics using Instagram's business insights tools and manually recorded them for accuracy.

## 2.2 Data Analysis

To standardize engagement measurement, the Engagement Rate was calculated using previous research that incorporated daily interactions and total interactions as key variables [30]. This formula offers a structured way to assess the level of audience interaction, allowing for consistent and comparable metrics across various contexts and timeframes. By using these two variables, daily interactions and total interactions, the Engagement Rate ensures a reliable measure of how engaged an audience is over a defined period. The formula applied to calculate the Engagement Rate is as follows:

$$E(\%) = \left( \frac{Id}{It} \right) \times 100\%$$

Where  $E(\%)$  represents the engagement rate expressed as a percentage,  $Id$  refers to the daily interactions, which encompass the total number of likes, comments, shares, and saves accumulated daily, and  $It$  represents the total interactions, which is the cumulative number of interactions that could potentially be achieved during the entire research period. This method provides a uniform and standardized way to quantify engagement, facilitating meaningful analysis across different social media platforms and marketing campaigns. By dividing the observed daily interactions by the maximum possible interactions and multiplying by 100, the formula converts the raw data into a percentage, offering a more interpretable and clear understanding of audience engagement.

Each metric was used to calculate Engagement rate percentages and observe correlations with sales activity. The resulting data was organized into tables and visualized through comparative graphs to highlight the relationship between digital interaction and consumer behavior. This method provided a clear understanding of how user engagement translated into purchasing decisions, offering valuable insights for MSMEs seeking to optimize their marketing strategies through social media.

## III. RESULT AND ANALYSIS

The analysis in this study examined Instagram engagement and consumer purchasing behavior across four clearly defined observational periods. These included the pre-Eid Al-Fitr week (March 24–30, 2025), representing the days leading up to the celebration; the post-Eid Al-Fitr week (April 1–7, 2025), which captured consumer behavior following the festive event; and two non-festive baseline weeks—the first spanning February 1–7, 2025, and the second from February 9–15, 2025. These timeframes were carefully selected to provide a comprehensive comparison between periods of heightened cultural significance and regular business operations.

By observing these intervals, the study aimed to reveal both the short-term impact of seasonal events on digital engagement and the

sustainability of consumer interest beyond peak periods. Within each timeframe, key Instagram engagement metrics were analyzed, including the number of likes, comments, shares, saves, and the total number of confirmed purchases made via direct messages. These indicators were selected for

their relevance in capturing user interaction and their potential to reflect shifts in purchasing behavior in response to content strategy and seasonal influence.

Table 1. First Week of Non-Festive Data

Date	Posts	Likes	Comments	Shares	Saves	Purchases	Engagement Rate (%)
01-02-2025	3	12	1	0	1	5	13.21%
02-02-2025	3	15	2	1	0	7	16.98%
03-02-2025	3	8	0	0	1	3	8.49%
04-02-2025	3	10	1	1	0	4	11.32%
05-02-2025	3	18	3	2	2	9	23.58%
06-02-2025	3	14	2	1	1	6	16.98%
07-02-2025	3	9	1	0	0	2	9.43%

According to Table 3.1, the data for the non-festive period revealed consistently modest engagement, with daily purchases ranging from 2 to 9 units and engagement rates fluctuating between 8.49% (February 3) and 23.58% (February 5). Despite maintaining a schedule of three daily posts, user interaction remained subdued in the absence of seasonal triggers. This was evident from the minimal activity on February 3, which recorded only 8

likes and 1 save, and the engagement rate on February 7, which stood at 9.43%.

The outlier on February 5 (23.58% engagement and 9 purchases) suggested that occasional organic spikes might occur. However, the overall patterns confirmed that sustaining high engagement required cultural relevance or promotional stimuli. This baseline data underscored the challenge of maintaining consumer interest during non-festive periods through routine posting alone.

Table 2. Second Week of Non-Festive Data

Date	Posts	Likes	Comments	Shares	Saves	Purchases	Engagement Rate (%)
09-02-2025	3	15	2	1	2	8	15.04%
10-02-2025	3	14	1	0	1	6	12.03%
11-02-2025	3	12	2	1	1	7	12.03%
12-02-2025	3	16	3	2	2	10	17.29%
13-02-2025	3	18	2	1	2	9	17.29%
14-02-2025	3	15	2	1	1	8	14.29%
15-02-2025	3	14	1	0	1	7	12.03%

Table 2 revealed that engagement during the second non-festive week peaked on February 12 and 13, with engagement rates reaching 17.29% on both days. On February 12, there were 16 likes, 3 comments, 2 shares, and 10 purchases, while February 13 closely followed with 18 likes and 9 purchases. These two days represented the highest engagement levels of the non-festive period, surpassing the week’s average engagement rate of 14.29%.

This sustained performance suggested that consistent, strategic content could drive meaningful engagement even in the absence of seasonal events. Although still lower than the peaks observed during festive periods, engagement levels consistently remained above 12% throughout the week. This indicated that thoughtful and cost-effective content planning could help maintain consumer interest during regular business

cycles. These findings reinforced the importance of maintaining high-quality content and implementing engagement

strategies consistently across the entire business calendar.

Table 3. Pre Eid Al-Fitr Data

Date	Posts	Likes	Comments	Shares	Saves	Purchases	Engagement Rate (%)
24-03-2024	3	30	3	2	3	2	<b>4.58%</b>
25-03-2024	3	45	2	2	2	9	<b>6.15%</b>
26-03-2024	3	68	9	5	8	15	<b>10.86%</b>
27-03-2024	3	56	3	8	2	23	<b>8.32%</b>
28-03-2024	3	100	25	23	40	27	<b>22.68%</b>
29-03-2024	3	93	45	25	50	34	<b>25.69%</b>
30-03-2024	3	98	32	38	12	21	<b>21.71%</b>

Table 3 revealed a significant upward trajectory in both engagement and purchases during the pre-Eid period. Starting with modest interaction on March 24 (4.58% engagement rate and 2 purchases), the data showed consistent growth, culminating in peak performance on March 29, with a 25.69% engagement rate and 34 purchases. This reflected a 5.6-fold increase in engagement over the six-day period, marked by particularly notable surges in saves (rising from 3 to 50) and comments (increasing from 3 to 45).

behavior, with engagement metrics showing their strongest correlation to purchases in the final days leading up to Eid. The substantial growth in saves (a 16-fold increase) and shares (a 12.5-fold increase) suggested that these interactions served as particularly strong indicators of purchase intent during culturally significant periods. This pattern highlighted how MSMEs could leverage festive anticipation through targeted content strategies that emphasize shareable and save-worthy posts to maximize conversion opportunities.

The data demonstrated a clear relationship between seasonal anticipation and consumer

Table 4. Post Eid Fitr Data

Date	Posts	Likes	Comments	Shares	Saves	Purchases	Engagement Rate (%)
01-04-2025	3	83	30	25	18	30	<b>34.67%</b>
01-04-2025	3	75	25	18	17	18	<b>30.00%</b>
01-04-2025	3	30	5	8	7	9	<b>11.11%</b>
01-04-2025	3	24	3	3	3	5	<b>7.33%</b>
01-04-2025	3	20	3	0	5	3	<b>6.22%</b>
01-04-2025	3	24	2	0	3	7	<b>6.44%</b>
01-04-2025	3	16	3	0	0	3	<b>4.22%</b>

Table 4 revealed a sharp decline in consumer engagement following Eid, with rates dropping from 34.67% on April 1 to just 4.22% by April 7—an eightfold decrease within one week. During the immediate post-Eid period (April 1–2), engagement remained strong, particularly on April 1, which recorded 30 comments, 25 shares, and 30 purchases. However, this momentum quickly dissipated, with shares and saves disappearing entirely by the end of the week.

This pattern highlighted a short-lived post-festive interest, followed by a rapid decline and eventual stabilization. The data revealed three distinct engagement phases: a brief peak (Days 1–2), a steep decline (Days 3–4), and a low baseline (Days 5–7). The complete erosion of shares and saves—key indicators of peer influence and future purchase intent—underscored the importance of implementing targeted post-holiday retention strategies to mitigate this predictable drop in engagement.

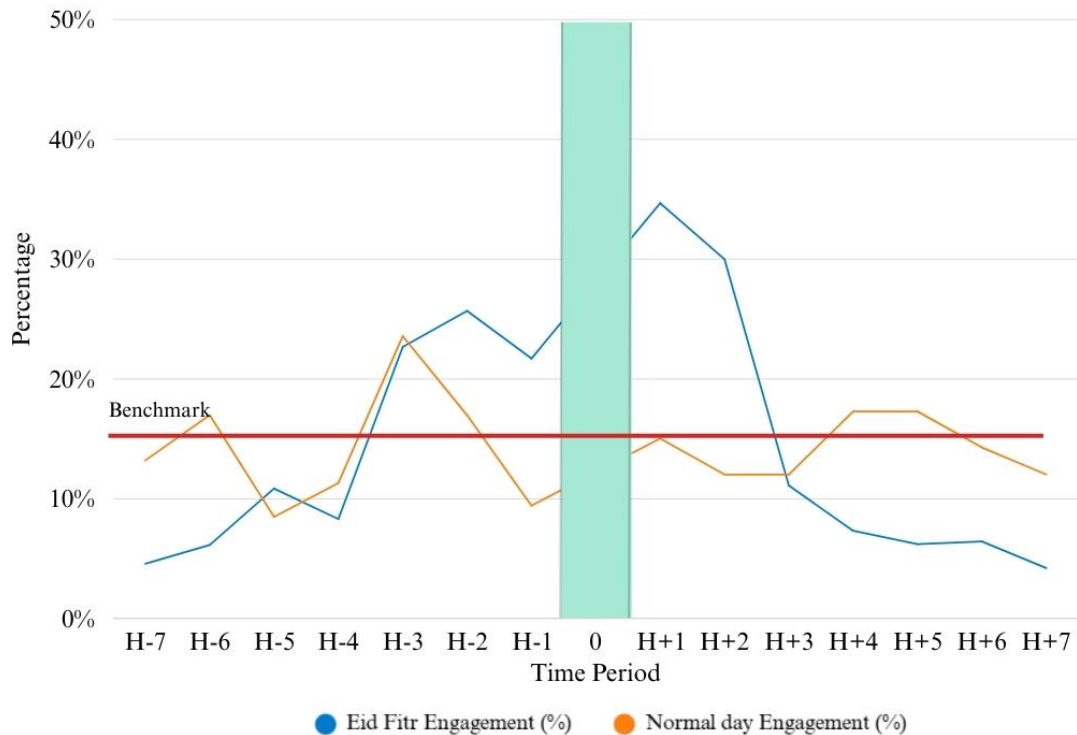


Figure 1. Engagement rate Comparison Chart

Figure 3.1 compared audience engagement percentages over a 15-day span, covering seven days before and after the Eid Fitr event (H-7 to H+7), highlighting the differences between festive-period and normal-day behaviors. The vertical shaded blue area, centered at “0,” marked the day of Eid Fitr and served as a focal point for comparing pre- and post-event engagement trends. This midpoint was crucial not only for understanding fluctuations during the festive period but also as a neutral reference for analyzing engagement on regular days.

A key feature of the chart was the clear contrast in engagement patterns: Eid Fitr engagement showed a significant upward trend leading up to the event, peaked shortly before Eid, and then declined sharply afterward. In contrast, normal-day engagement remained relatively flat and consistently lower throughout the entire period. This divergence emphasized the cultural impact of Eid Fitr in boosting audience interaction.

The chart included a red horizontal benchmark line set at 16.5%, which acted as a threshold for evaluating engagement strength. This benchmark was derived by visually identifying the midpoint between the Eid Fitr engagement peak (approximately 34.7%) and the average engagement on normal days (around 12.5%). By anchoring the benchmark between these two values, the chart effectively illustrated how engagement levels during Eid Fitr surpassed typical interaction rates, particularly in the days leading up to the celebration.

Following the event, however, engagement on Eid Fitr days dipped well below the benchmark, signaling a post-event drop-off. On normal days, engagement consistently remained at or below the 16.5% line, reinforcing the unique role of festive occasions in driving audience behavior. The combination of clear visual elements such as the shaded event marker, labeled time intervals, and the benchmark line enhanced the chart’s readability. The data underscored a central

insight: cultural events like Eid Al-Fitr significantly elevated engagement, especially during the anticipation phase, but sustaining that momentum after the event remained a challenge. For added clarity, including a brief explanation of the “H” notation (e.g., H-1 = 1 day before Eid Al-Fitr) and specific engagement metrics could have further enriched the chart’s context and interpretability.

## VI. CONCLUSION

This study demonstrated how Instagram engagement metrics directly influenced pastry sales for MSMEs, with cultural events like Eid Al-Fitr creating dramatic fluctuations in consumer behavior. The analysis revealed a 25.69% engagement peak (29th March) during the pre-Eid anticipation phase, which drove 34 purchases through high saves (50) and shares (25), followed by an 8.2-fold collapse to 4.22% engagement (7th April) post-event. Non-festive periods maintained modest but stable engagement levels (6–17%) and sales ( $\leq 10$  units per day), highlighting the need for distinct strategies across different seasonal phases.

From an information systems (IS) standpoint, this research underscored the transformative potential of integrating social media analytics into MSME workflows. By systematically tracking engagement metrics, businesses were able to convert raw data into actionable insights, such as prioritizing content formats (e.g., saves for Eid campaigns) or timing promotions around peak interaction days. The study advocated for IS frameworks that automated data collection, visualized trends, and aligned marketing strategies with real-time consumer behavior. Such systems not only enhanced decision-making but also bridged the gap between organic engagement and sustainable sales growth, positioning MSMEs to thrive in dynamic digital economies.

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