Fountainhead

The Journal of Business Research

Volume 3 | January-June 2025 | Issue 1

Research

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Aim & Scope

Fountainhead – Journal of Business Research is a peer-reviewed academic journal committed to advancing contemporary thought and practice in business and management. The journal seeks to provide a rigorous platform for intellectual exchange, encouraging contributions that bridge the gap between theory and practice while addressing the dynamic challenges of the global business environment.

The journal features original research articles, management cases, conceptual and analytical papers, book reviews, and critical reviews of emerging trends. It welcomes interdisciplinary scholarship across diverse domains including management, marketing, finance, human resources, entrepreneurship, operations, technology, business ethics, and sustainability. Emphasis is placed on works that offer fresh insights, foster innovation, and contribute to both scholarly understanding and managerial decision-making.

With a vision to promote knowledge dissemination and dialogue between academia, industry, and policymakers, the journal aspires to be a credible source of reference for researchers, practitioners, and students in the field of business research.

ISSN: 2457-1040

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Keywords: Procurement Data Hygiene, Supply Chain Analytics, Data Governance, Spend Management, Cognitive Analytics, Supplier Risk Management.

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Keywords: Consumer-packaged goods, Perceived quality, Brand preference, Eco-friendly packaging, Ahmedabad market, Consumer behaviour

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Keywords: Robo-advisory, Algorithmic trading, Financial technology, Investor perception, Fintech adoption, Retail investors

RESEARCH

The Role of Emotions in Brand Loyalty: Analyzing How Brands Evoke Positive Emotions to Build Lasting Customer Relationships

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Executive Summary

Abstract

In today's busy market, keeping customers loyal needs more than just good quality products or low prices. It also needs a real connection between customers and the brand they love. This research looks at how positive feelings affect how loyal customers are and finds ways to build lasting relationships with them. Using ideas like affective conditioning and emotional branding, the study shows that feelings like happiness, trust, excitement, satisfaction, and admiration are big reasons why customers stay loyal. The research used both qualitative and quantitative methods, including interviews, focus groups, and surveys, to understand both the depth and wide range of emotional connections. The results show that storytelling, being genuine, and personal interactions with the brand help form strong emotional ties. The numbers also show that these emotions are strong predictors of loyalty, like customers buying again or telling others about the brand. Visual brand elements, clear and consistent communication, and strategies that fit different cultures help make these emotional connections stronger. The study also shows that factors like who the customer is and what kind of product they buy can change how they feel about a brand, so it's important to tailor strategies to different groups. The paper gives advice to marketers on how to use stories, experiences, and personalized interactions in their brand plans. It shows that emotional branding isn't just an extra tactic it's a key part of long-term brand success. By learning how emotions play a role in customer behaviour, brands can create real, lasting experiences that build loyalty and give them an edge in the market.

Keywords
Brand Loyalty, Emotional Branding, Consumer Behavior, Positive Emotions, Storytelling, Customer Engagement

Introduction

In modern marketing, brand loyalty has moved from just being a result of buying the same product again and again to being a deeper connection between consumers and brands. At first, people thought of loyalty as simply buying again and again (Day, 1969). But later, researchers realized that loyalty is more than just behaviour it also includes feelings and attitudes. Fournier (1998) explained that customers often see brands as if they were friends or partners, forming relationships based on care, trust, and loyalty. This idea of seeing brands as relationships is now a key part of how we understand branding. It shows that loyalty is not just about making purchases but about forming real emotional ties.

Relationship marketing theory says that trust, satisfaction, and commitment are key to keeping customers connected to a brand over time (Morgan & Hunt, 1994). Trust means customers believe the brand is reliable. Satisfaction comes from the brand meeting or exceeding expectations. Commitment happens when a customer feels strongly connected to the brand and sees it as part of who they are. These factors influence what customers do like buying again, telling others about the brand, and not switching to competitors (Garbarino & Johnson, 1999). Emotions such as love, attachment, and admiration also play a big role in explaining why customers stay loyal, even in tough markets (Carroll & Ahuvia, 2006).

In today's crowded and competitive market, emotional branding is essential for standing out. While things like satisfaction and product quality are still important, they aren't enough anymore because there are so many brands and products are often similar (Oliver, 1999). Researchers like Roberts (2006) argue that loyalty should go beyond just being happy with a product and include emotional connection. Customers are more likely to stay loyal if they feel a brand truly understands and resonates with them emotionally. These deep connections turn simple purchases into meaningful experiences that reflect who the customer is, making the brand part of their story (Unal & Aydin, 2013).

The difference between being satisfied and being loyal has been studied a lot. Experts say that while people might be happy with a single purchase, real loyalty comes from deeper feelings that develop over time through repeated interactions. Kotler (1997) explains that satisfaction is the starting point for emotional connections, but it doesn't mean someone will be loyal. Jones and Sasser (1995) also highlight this by showing that loyal customers are more attached, trust the brand more, and often talk about it positively. Carroll and Ahuvia (2006) add to this by talking about brand love, which is a strong emotional bond that predicts loyalty better than just satisfaction alone.

To use these ideas in real life, brands use strategies like storytelling, creating experiences, and personalizing interactions. Storytelling helps brands share values through stories that match what people want and how they live, making them feel connected to the brand (Escalas, 2004). Experiential marketing makes experiences that bring out feelings like joy, nostalgia, or excitement, making brand experiences more memorable. Personalization, such as customized messages or interactive digital experiences, makes customers feel seen and valued, which increases their emotional connection. All these efforts depend a lot on authenticity. People now want brands to be open, honest, and responsible (Beverland, 2005). Authenticity helps build trust, which leads to and supports lasting loyalty.

The growth of digital platforms and global markets has made emotional strategies more important. With so many choices available, people can switch between brands easily, especially with the help of technology. E-commerce websites often make it easier for customers to compare brands and focus more on the platform itself rather than the brand. In this situation, creating emotional connections is key. Brands that can make people feel something are more likely to stay in customers' minds even when the market changes.

From a theoretical angle, the emotional reasons behind brand loyalty are linked to attachment theory and how people identify with brands. Bowlby's (1982) attachment theory shows how people build safe emotional ties with people who offer comfort and support, and this idea has been used to understand how people feel about brands. Many consumers see trusted brands as a source of emotional security, especially when they're uncertain or stressed. Similarly, Sternberg's (1986) triangular theory of love, which includes intimacy, passion, and commitment, has been adapted to explain brand love, where people show closeness, enthusiasm, and lasting loyalty to certain brands (Batra, Ahuvia, & Bagozzi, 2012). Theories on consumer-brand identification also suggest that loyalty happens when people see brands as part of their identity, matching their values, goals, and image (Bhattacharya & Sen, 2003).

Emotions play different roles depending on the industry, product type, and the group of people involved. In luxury and fashion, admiration and aspiration are key, because customers connect brands with prestige and self-expression. In tech sectors, excitement and trust are important, showing the need for both new ideas and reliability. In hospitality and services, satisfaction and comfort are central, focusing on the experience of care and personal attention. Emotional influences also vary by age and culture: younger people often look for something new and exciting, while older people value trust and consistency (Holbrook & Schindler, 1994). In collectivist cultures, harmony and trust are more important, while in individualistic cultures, self-expression and personal achievement take centre stage (Shavitt et al., 2006). These differences show the importance of creating emotional branding strategies that are tailored to different groups and situations.

Given this background, this study has two main goals. First, it aims to find out which positive emotions like joy, trust, excitement, satisfaction, and admiration are most important in building brand loyalty across different consumer groups and product types. By looking at multiple emotions at once, the study goes beyond examining only one emotion at a time, providing a broader view of what drives emotional loyalty. Second, the study looks at how effective brand communication methods like storytelling, visual design, and interactive experiences are in creating these emotions and promoting loyalty. In doing so, the research combines theory with real-world branding strategies, giving marketers useful ideas they can use.

This research brings three important new ideas to the field. First, it helps connect consumer psychology with branding by showing how different emotions work together to build loyalty. Second, it uses a mix of methods both detailed qualitative analysis and statistical testing to ensure the findings are both in-depth and widely applicable. Third, it gives managers clear advice on how to create emotional branding strategies that connect with a variety of people while staying true to the brand's identity.

Understanding emotional loyalty is especially important now, as consumers face so many choices and are flooded with information. Often, they stop relying on logic and instead make decisions based on how they feel and how a brand fits with their personal values. Emotional branding helps companies go beyond simple buying experiences, creating stronger and longer-lasting relationships that give them an edge in the market. Loyalty based on emotion makes customers less sensitive to prices, more likely to recommend the brand, and more protected from competitors. In short, adding emotions to loyalty research marks an important change in marketing theory and practice. This study recognizes that while satisfaction and trust are still important, they are not the whole story. Emotions like happiness, respect, and excitement make the relationship between consumers and brands deeper and more meaningful. By finding out which emotions are most powerful and testing ways to encourage them through communication, this research improves academic knowledge and gives professionals the tools they need to succeed in markets that are driven by emotion.

Literature Review

Brand loyalty has always been a key topic in marketing research, going through several changes in how it's understood and studied. In the past, loyalty was seen as something people did, like buying the same brand again and again over time (Day, 1969). This approach gave clear ways to measure loyalty but didn't look at why people made those choices. Later, researchers started to think about loyalty in a broader way, including how people feel and what they think about a brand (Oliver, 1999). Today, most experts agree that brand loyalty is made up of several parts: consistent buying behaviour, emotional connection, positive attitudes, and how well a brand is seen in the mind of the consumer ((Harris, 2004).

Satisfaction was one of the first things studied as a factor that leads to loyalty. (Oliver, 1980) described satisfaction as how well a product meets or goes beyond what a customer expected. Many studies showed that satisfied customers are more likely to buy again and tell others about the brand (Bloemer, 1995). However, later research found that just being satisfied isn't enough to guarantee loyalty, especially in markets where it's easy to switch brands (Jones, 1995). (Allison, 1997) said that while satisfaction is important, real loyalty comes from deeper emotions. (Bahri-Ammari, 2016) added that when people have satisfying experiences repeatedly, they start to feel more attached, showing a move from simple satisfaction to strong emotional connections.

Attachment theory, first developed by (Bowlby, 1982), has been used a lot in studying how people connect with brands. Emotional attachment is a strong emotional bond between a customer and a brand, marked by feelings of affection, passion, and the belief that the brand is hard to replace (Thomson, 2005). (Lacoeuilhe, 2000) explained that this kind of attachment helps a brand stay profitable by making customers more likely to keep buying and less likely to switch to competitors. Brand love, introduced by (Carroll, 2006), is a more intense version of attachment, involving strong emotions like passion, excitement, and a long-term commitment. Studies show that brand love is a better predictor of loyalty than satisfaction, influencing people to pay more, ignore bad information, and promote the brand (Batra, 2012). The main difference between attachment and love is how strong the emotion is: attachment can form with a moderate level of emotion, while brand love comes from deep passion and lasting commitment (Hwang, 2012).

Research on how consumers relate to brands (CBR) includes these ideas in bigger marketing models. (Morgan, 1994) found that trust and commitment are important for how good a relationship is between a consumer and a brand. They showed that strong connections between consumers and brands lead to more loyalty and less sensitivity to price. Trust helps reduce uncertainty, makes people feel safer, and lets them know the brand will meet their expectations (Chaudhuri, 2001). Emotional connection in CBR grows through regular interactions like customer service, events, and social media, which help build stronger bonds and make brands a regular part of people's lives (Hur, 2011). (Khamitov, 2019) found that strong brand relationships lead to more repeat purchases, stronger support for the brand, and less likelihood of switching to another brand.

Emotional branding has become a key strategy based on these findings. (Lafferty, 2001) explains emotional branding as creating real emotional links between consumers and brands on purpose. Unlike just transactional approaches, emotional branding focuses on stories, being genuine, and using senses to connect. (Escalas, 2004) shows that brand stories make an impact when they match what people want in their lives, helping them feel connected and loyal. (Beverland, 2005) says storytelling must be real; if the story doesn't match what the brand actually does, people might feel confused and lose trust. Elements like logos, colours, and packaging help with emotional branding by making people feel certain emotions and helping them remember the brand (Henderson, 1998). (Park, 2010) note that consistent messages across all brand touchpoints help build stronger emotional ties in people's minds and preferences.

Demographics and cultural backgrounds also shape what makes people loyal to brands emotionally. (Holbrook, 1994) found that younger people prefer new, innovative, and exciting things, while older people value

reliability and trust. (Shavitt, 2006) show that in cultures that value groups, trust, harmony, and belonging are important, whereas in individualistic cultures, self-expression and personal success are more valued. Different industries also affect how emotional appeals work. In hospitality, comfort, satisfaction, and personal service are key to loyalty. In fashion and luxury, admiration and the desire to be seen as successful drive emotional connections by linking to how people see themselves. In technology, innovation and trust are crucial, as people rely on brands to be both new and reliable. These differences show that emotional branding should be adapted to fit different groups and cultures.

Emotional intelligence (EI) is also connected to how consumers relate to brands (Mayer, 1997) define EI as the ability to understand and manage emotions. (Zeidner, 2004) say that people with higher EI understand brand messages better, leading to a stronger sense of authenticity and trust. (Beason-Held, 2007) shows that trust helps with both making a purchase and keeping a long-term relationship with a brand. By creating emotional connections, EI helps people relate more deeply to brand messages, making them more open to emotional branding strategies. Brand loyalty serves as a valuable strategic resource that boosts a brand's overall value. (Keller, 1992) highlights that loyal customers lower marketing expenses, make revenue more predictable, and make it harder for competitors to enter the market. (Dick, 1994) separated loyalty into two types: behavioural loyalty, which is shown through repeated purchases, and attitudinal loyalty, which comes from a positive view of the brand and a strong sense of commitment. (Härtel, 2010) brought these ideas together by introducing emotional loyalty, which includes both consistent behaviour and a deep emotional connection to the brand. Emotional loyalty not only leads to more purchases but also increases customer advocacy, makes customers more willing to pay higher prices, and helps them resist competitors' marketing efforts.

Even though there's been a lot of research on emotional loyalty, there are still important areas that need more study. Much of the existing work looks at just one emotion, like satisfaction or brand love, rather than how several positive emotions work together. Not many studies look at how emotions such as joy, trust, admiration, excitement, and satisfaction affect loyalty at the same time, so it's unclear which emotions are most important. Similarly, most research focuses on individual communication methods, like storytelling or visual design, without combining them into a full model of emotional branding. There's limited understanding of how communication strategies and emotional factors interact, especially across different cultures and industries. Another area that needs more attention is how loyalty changes over time: most studies are based on single points in time, making it hard to track how emotional bonds develop through a brand's life cycle.

This study tackles these gaps by using a combination of qualitative and quantitative methods to gain a deeper understanding. It explores multiple emotions at once, offering a more detailed view of the emotional range that influences loyalty. The research also examines how storytelling, visual branding, and experiential strategies work together to create emotions and improve the connection between consumers and brands. Additionally, it considers how demographics, cultural backgrounds, and industry factors affect emotional responses, providing a thorough and context-aware model of brand loyalty.

The literature shows that brand loyalty has evolved from just being about transactions to including emotional and relational aspects. While satisfaction is still important, it's not enough in competitive markets where customers have many choices. Emotional elements like attachment, love, trust, and admiration offer better explanations for lasting loyalty, and communication practices like storytelling and visual design help bring these emotions to life. Different demographic, cultural, and industry factors influence how emotions are expressed, which means brands must develop tailored strategies. Even with these advancements, existing research still has unanswered questions about how multiple emotions interact, how communication strategies should be integrated, and how loyalty develops over time. By addressing these issues, this study adds value both in theory and in practice, giving a better understanding of how emotions influence brand loyalty in various situations.

Research Methodology

The study used a well-planned method to reach its goals of finding out which positive emotions lead to brand loyalty and checking how well emotional branding works. Since emotional connections are both personal and powerful, the research combined both qualitative and quantitative approaches in a step-by-step way. This helped gather deep insights into what consumers feel and also supported the findings with statistical data from a bigger group. The study used interviews, focus groups, and surveys, and analysed the data with advanced statistical tools. This balance between depth and reaching a wide audience gave a solid basis for understanding how emotions affect brand loyalty.

The research had two main parts that were related. The first part, which was qualitative, looked at the emotional sides of how people connect with brands. It involved talking with people about their favourite brands and their experiences. The second part, which was quantitative, built on these findings by using surveys to measure how emotions influence loyalty in a larger and more varied group. The step-by-step approach made sure that the survey questions were based on real feelings people had, not just ideas from theory.

In the first part, the study talked to people from different backgrounds to capture a wide range of emotions. They considered factors like age, gender, income, education, and product preferences, as emotions can change depending on life stage and what people use. Each interview was about 45 to 60 minutes long and used a semi-structured guide to help people share stories about brands, how they felt about them, and what the brands meant to them. The open-ended questions let people express feelings. Focus groups, each with six to eight people, helped add more depth to the interviews by letting participants talk and share their experiences. These discussions allowed people to think more deeply about their feelings and compare them with others. The group settings often uncovered shared feelings, like a general appreciation for a brand's story or common complaints about how a brand acts inconsistently. The sessions let people express more detailed emotions, giving a clearer and more complete picture than individual interviews alone. All the conversations were recorded with permission, written down exactly as they were said, and then analysed for themes.

To analyse the themes, we used an inductive approach. We started by making notes from the recordings, then grouped these notes into bigger categories that represented repeated emotional patterns. Using NVivo software, we organized these notes and saw how different themes were connected. Five emotional factors – trust, satisfaction, joy, admiration, and excitement – appeared consistently across different groups and product areas. This showed their importance for further research. This phase also showed that how brands communicate, through storytelling, being real, and using visuals, plays a big role in creating emotional connections and building loyalty.

Based on these findings, the study created a structured survey for the quantitative part of the research. The survey included questions taken from known scales used in previous studies, such as those measuring trust (Chaudhuri & Holbrook, 2001), satisfaction (Oliver, 1999), and brand love (Carroll & Ahuvia, 2006). We also included questions from the qualitative interviews. Respondents rated their feelings and how loyal they felt toward a brand using a five-point scale, which helped keep the answers consistent and easy to compare. The survey also asked about how people perceived storytelling and visuals, to see how these elements affected emotional connections with a brand. The survey used purposeful sampling, which means we selected people who had strong feelings about specific brands in areas like fashion, technology, food, and hospitality. Most of the data was collected online, which helped reach people in different places and included a wide range of participants. However, it also meant that younger and tech-savvy people responded. In total, nearly 400 responses were collected, which was enough to do more complex analyses like regression and structural equation modelling. The survey also gathered basic information about the participants, confirming that there was a good balance between men and women, and that people's ages ranged from teenagers to middle age.

Quantitative analysis started with descriptive statistics to better understand the sample and show how common different emotional responses were in each category. Then, inferential methods were used to check if the study's ideas were correct. Pearson correlation coefficients helped find how strong and in what direction the links were between emotional factors and brand loyalty. Multiple regression analysis looked at how much each emotional factor and communication strategy influenced loyalty, while taking into account things like age and gender. Analysis of variance (ANOVA) compared emotional responses and levels of loyalty across different industries, and post hoc tests found exactly where the differences were. Structural equation modelling (SEM) gave a full picture of how emotions, branding strategies, and loyalty results are connected.

Making sure the study was valid and reliable was really important. To check if the survey questions were measuring what they were supposed to, we used items from earlier studies and then improved them with feedback from the qualitative part. This ensured the questions matched real experiences. Confirmatory factor analysis showed that emotions like trust, satisfaction, joy, admiration, and excitement were different but connected. Reliability was checked with Cronbach's alpha scores, which were all above the standard 0.70, meaning the surveys were consistent. In the qualitative part, we made sure the findings were credible by looking at data from interviews and group discussions and letting participants review and agree with our interpretations of their responses.

The study followed ethical rules carefully. We got approval from the research ethics committee at Shanti Business School. Participants were told about the study, promised their information would be kept private, and reminded they could leave without any problems. We got their permission before they started, and kept their details anonymous during data collection and analysis. We stored the data securely and only used it for academic purposes. We also tried to avoid making people uncomfortable by letting them skip questions or stop the process anytime they wanted, especially when talking about bad brand experiences.

Although the mixed-method approach made the study stronger, there were still some limitations. Because the data was self-reported, there was a chance of bias, with people possibly exaggerating or downplaying their feelings and loyalty. Since it was a cross-sectional design, we only got one snapshot in time, making it hard to see how emotions and loyalty change over time. Collecting data online also led to some bias because it missed people who don't have easy access to the internet, which might not represent older or less tech-savvy groups. Despite these issues, combining deep qualitative insights with solid quantitative analysis gave strong findings about emotional branding.

Using a mixed-method approach was based on the study's two main goals: understanding the deep emotional experiences of consumers and seeing how these emotions apply to different groups. Qualitative methods helped uncover the real-life experiences and personal stories behind brand loyalty, showing emotions that might not come up in questionnaires. Quantitative methods provided the statistical proof needed to show how important these emotions are and how they link to loyalty outcomes. Together, the two phases supported each other, connecting personal stories with generalizable findings.

Including various industries and different groups made the findings widely applicable. It also used both well-known measurement tools and new items that fit current situations, balancing the ability to compare with past research and understanding today's consumer needs. Adding communication strategies like storytelling and visual elements expanded the analysis beyond just emotions, giving a more complete picture of how branding affects loyalty.

Data Analysis

The data from the quantitative survey was studied using SPSS and AMOS to look at how positive emotions, brand communication strategies, and brand loyalty are connected. A summary of the data showed that the people

surveyed were fairly spread out in terms of age, gender, and the types of products they buy, which means the way the sample was chosen helped get a good mix of different backgrounds. People shared which brands they liked the most in areas like fashion, technology, food and drinks, and hospitality, making it possible to compare how different brands are seen across these areas.

The first part of the study used frequency distributions to find out how common certain positive emotions were among the brands people liked best. Emotions like joy, trust, excitement, satisfaction, and admiration were measured on a five-point scale. Trust had the highest average score (M=4.32, with a standard deviation of 0.51), and satisfaction was next (M=4.27, with a standard deviation of 0.56), showing these emotions are closely linked to brand loyalty. Joy (M=4.15, standard deviation 0.63), admiration (M=4.10, standard deviation 0.58), and excitement (M=4.05, standard deviation 0.66) were also strong, meaning all five emotions had a high level of connection with brand loyalty.

To check if factors like age, gender, or product type affected emotional responses, chi-square tests were done. The formula used for each test was:

$$\chi^2=\Sigma \quad \frac{(o_{ij}-E_{ij})^2}{E_{iJ}}$$

Where, Oij represents the observed frequencies and Eij represents the expected frequencies in each cell of the contingency table. The results showed a statistically significant link between age group and the level of excitement reported ($\chi^2 = 18.74$, df = 8, p = 0.016), meaning younger consumers (18–24) felt more excited than older groups. However, there were no significant differences in trust ($\chi^2 = 4.12$, df = 4, p = 0.39) or satisfaction ($\chi^2 = 3.95$, df = 4, p = 0.41) between genders, indicating these emotions are valued similarly by both male and female consumers. A correlation analysis was done to see how strong and in what direction the relationships are between emotional drivers and brand loyalty. The Pearson's correlation coefficient (r) was calculated using:

$$r = \frac{\sum(X-\bar{X})(Y-\bar{Y})}{\sqrt{\sum(X-\bar{X})^2 \Sigma(Y-\bar{Y})^2}}$$

Where, X represents scores for each emotional variable and Y represents brand loyalty scores. Trust had the strongest link with loyalty ($r = 0.74$, $p < 0.001$), followed by satisfaction ($r = 0.71$, $p < 0.001$), admiration ($r = 0.69$, $p < 0.001$), joy ($r = 0.67$, $p < 0.001$), and excitement ($r = 0.65$, $p < 0.001$). These results show that while all five emotions are connected to loyalty, trust and satisfaction are the best at predicting it.

To measure how much emotions and communication strategies influence brand loyalty, multiple linear regression analysis was carried out. The regression model used was:

$$Y=\beta_0+\beta_1 X_1+\beta_2 X_2+\beta_3 X_3+...+\beta_n X_n+\varepsilon$$

In this study, brand loyalty is shown to be influenced by different factors like emotions and how messages are communicated. These factors are called independent variables, and they have different strengths in predicting loyalty. The relationship between these factors and brand loyalty is measured using regression coefficients, and there is also an error term to account for other factors not included in the model. The overall model was found to be statistically significant ($F(7, 392) = 86.45$, $p < 0.001$) with an adjusted R^2 of 0.601, meaning that about 60.1% of the variation in brand loyalty can be explained by these predictors. The strongest predictors were trust ($\beta = 0.28$, $p < 0.001$), satisfaction ($\beta = 0.25$, $p < 0.001$), and storytelling effectiveness ($\beta = 0.22$, $p < 0.001$), followed by visual appeal ($\beta = 0.18$, $p < 0.01$) and excitement ($\beta = 0.15$, $p < 0.05$). Joy and admiration had a positive relationship with

loyalty, but they were not statistically significant after adjusting for other factors.

An analysis of variance (ANOVA) was conducted to compare brand loyalty across different product categories.

$$F = \frac{MS_{between}}{MS_{within}}$$

The results showed that there was a significant difference in brand loyalty scores between categories ($F(4, 395) = 5.87$, $p < 0.001$). Post-hoc Tukey tests found that hospitality brands (mean = 4.45) and fashion brands (mean = 4.38) had significantly higher loyalty scores than technology brands (mean = 4.05). This suggests that industries with more service interaction and experiential qualities may lead to stronger brand loyalty through emotional connections. No significant differences were found between food and beverage brands (mean = 4.29) and other categories, indicating that loyalty is relatively consistent in this sector.

In addition to the main analysis, structural equation modelling (SEM) was used to examine both direct and indirect effects of emotional drivers and communication strategies on brand loyalty. The model had good fit indices (χ^2/ def. = 2.14, CFI = 0.958, RMSEA = 0.054), showing that it is a suitable model. Trust had the strongest direct effect on brand loyalty ($\beta = 0.41$, $p < 0.001$), while storytelling influenced loyalty both directly ($\beta = 0.22$, $p < 0.01$) and indirectly through trust ($\beta = 0.12$, $p < 0.05$). Visual appeal also had a direct effect ($\beta = 0.19$, $p < 0.01$) and an indirect effect through admiration ($\beta = 0.10$, $p < 0.05$).

A summary of key regression coefficients is presented in Table :

Table 1. Multiple Regression Analysis Predicting Brand Loyalty

Predictor	**β**	**t**	**p**
Trust	0.28	6.74	0.001
Satisfaction	0.25	6.21	0.001
Storytelling	0.22	5.83	0.001
Visual Appeal	0.18	3.15	0.002
Excitement	0.15	2.04	0.042
Joy	0.09	1.42	0.156
Admiration	0.08	1.31	0.191

These findings show that trust and satisfaction are very important for building brand loyalty, and they also show how brand communication plays a smart and important role. Storytelling came out as especially useful, not just because it helps create loyalty directly, but also because it helps build trust. This means that stories that match what consumers care about can create stronger emotional connections. Visual appeal, while not as powerful as storytelling, still has a big effect, which supports theories about how beauty and style influence how people see a brand (Henderson & Cote, 1998).

The results also show that not all positive emotions have the same impact on loyalty when you look at things in a more detailed way. Even though joy and admiration were closely linked with loyalty in simpler studies, their influence became smaller when other factors like trust, satisfaction, and communication were taken into account. This suggests that some emotions may not be as central, but they can still help with loyalty by being connected to key factors like trust.

Looking at different product areas using ANOVA and post hoc tests gave more context to these findings. The high loyalty seen in the hospitality and fashion industries may be because of personalized service and self-expression, which help build trust and satisfaction. On the other hand, lower loyalty in technology brands could be because of fast changes and quick product updates, which can break long-term emotional connections.

The SEM analysis also showed that trust and satisfaction act as middle links between communication methods and loyalty. Storytelling and visual appeal had a bigger effect when they helped create more trust and satisfaction, proving that communication efforts must focus on strengthening these key feelings to keep loyalty going. This matches emotional branding theory, which says that surface-level things like visuals only work well if they are backed by real promises and consistent actions.

Discussion

This study aimed to look at how positive emotions affect brand loyalty and to check how emotional branding strategies help in building and keeping long-term relationships with consumers. The research was based on relationship marketing, attachment theory, and emotional branding. It used a mixed-method approach that combined both qualitative and quantitative techniques. The results showed that brand loyalty is not just about being happy with how well a product works, but it's a more complex idea that comes from emotions like trust, satisfaction, joy, admiration, and excitement. By looking at how these emotions connect with ways brands communicate, such as storytelling and visual design, the study helped improve both the theory and practical use of emotional branding.

The study found that trust and satisfaction were the strongest factors that predicted brand loyalty, regardless of the product type or the people involved. Trust was about how confident a customer felt in a brand's reliability and truthfulness, while satisfaction was about how happy a customer was with the brand's performance compared to what they expected. These two emotions worked together to create lasting loyalty. Trust helped reduce uncertainty, and satisfaction made customers feel their choice was right. These findings align with previous ideas that loyalty isn't just about being satisfied once in a while, but about building a strong emotional connection that grows over time.

The quantitative part of the study used correlation and regression analysis to back up these findings. Using Pearson's correlation coefficient, the study found that trust and satisfaction had the strongest links with brand loyalty. Trust had a correlation of $r = 0.74$ and satisfaction had $r = 0.71$, both significant at $p < 0.001$. The regression equation used was:

$$Y=\beta_0+ \beta_1X_{trust} + \beta_2X_{satisfaction} + \beta_3X_{joy} + \beta_4X_{admiration} + \beta_5X_{excitement}$$

$\beta=0.18$, $p<0.01$) also played a significant role, showing that how communication strategies are used can greatly affect emotional responses. Excitement had a smaller impact ($\beta=0.15$, $p<0.05$), while joy and admiration were linked positively but didn't stay significant once other factors were considered. This suggests that while many emotions influence loyalty, trust and satisfaction are the main building blocks that support other emotions.

Structural equation modelling (SEM) helped explain the connections between emotions and communication strategies. The model fit well ($\chi^2/df=2.14$, CFI=0.958, RMSEA=0.054), proving it was reliable. According to the SEM results, storytelling directly influenced brand loyalty ($\beta=0.22$, $p<0.01$), and also indirectly increased loyalty by building trust ($\beta=0.12$, $p<0.05$). This shows that telling authentic and meaningful stories helps create trust and emotional connection. Similarly, visual design had both a direct effect ($\beta=0.19$, $p<0.01$) and an indirect effect through admiration ($\beta=0.10$, $p<0.05$). These results show that communication strategies don't just add style or story; they actually shape the emotional path that connects consumers to brands.

The study also found differences based on industry. Analysis of variance showed that hospitality and fashion brands had much higher loyalty scores than technology brands. This makes sense because service and lifestyle industries are more about personal experiences and identity, where brands depend on personal connections and emotional meaning. Technology brands, on the other hand, deal with quick product changes and innovation, which can make it harder to build lasting loyalty. This suggests that industries that only focus on how well their products work may struggle to build emotional loyalty unless they also connect with people's identity and personal values.

Theoretical implications of these findings are important. First, the results support the idea that emotions, especially trust and satisfaction, are at the heart of loyalty. They also back up the use of attachment theory and Sternberg's triangular theory of love in branding, showing that loyalty is made up of three parts: intimacy (trust), passion (excitement and joy), and commitment (satisfaction and admiration). Second, the findings refine existing research by showing that not all emotions are equally important—some emotions are the foundation, while others just help boost loyalty. Third, the study brings communication strategies into the emotional model, showing that storytelling and visual design act as tools that can either strengthen or weaken the emotional path to loyalty.

Managers can clearly see the real-world impact of these ideas. To keep customers loyal, brands need to focus on building trust by being open and honest, keeping a high standard of quality, and making promises that are true to their values. Satisfaction can be kept high by delivering excellent performance, listening to what customers say, and consistently providing real value. The stories a brand tells should connect with what people believe in and what they hope to achieve, showing they are genuine and relevant to their culture. The way a brand looks should also make people feel good by showing beauty, showing off status, or having deeper meaning. Most importantly, these different parts need to work together because emotions build up over time and affect each other. For example, a good story that doesn't follow through on promises can't really keep people loyal. Likewise, a design that looks nice but doesn't make people feel something won't create deep connections.

The study also shows that loyalty comes from having the same positive experiences over and over. Unlike being happy with a single transaction, which can change with each time you buy something, emotional loyalty grows as people have more happy moments that make them trust and feel good about the brand. Managers should think of emotional branding not as a short-term event, but as a long-term effort that involves every part of the customer experience, from ads and product design to customer service and after-sales support.

Even though the results are strong, there are some things to consider. The data came from people's own reports, which might mean they said more positive things than they felt. The study was done in one moment, so it can't show how emotions change over time. The sample was taken online, which probably included more younger people who are used to digital things, so it might not apply to everyone. However, using both types of data qualitative and quantitative helped reduce these problems, showing both real-life feelings and clear patterns.

In the future, more research can build on these findings by looking at how emotions change as the relationship between the brand and the customer gets longer. Comparing different cultures could show how values affect what makes people loyal. Also, as digital tools and AI change how brands communicate, it would be helpful to look at how things like influencer marketing, interactive experiences, and tailored content influence emotional loyalty. This could make the research even more useful for brands in the real world.

Conclusion

The study shows that positive feelings are really important for building and keeping brand loyalty, which agrees with previous research that says emotional connection is key in how consumers relate to brands. Out of the five positive emotions measured trust, satisfaction, joy, admiration, and excitement trust and satisfaction were the strongest in predicting loyalty, both when looking at correlations and in detailed statistical analysis. This matches

earlier work by Chaudhuri and Holbrook, who said trust is the base for long-term brand loyalty, and Kotler's idea that satisfaction is the emotional reason behind lasting loyalty. The fact that these results hold true across different groups of people and types of products suggests that trust and satisfaction might be common factors in building loyalty, no matter the market situation.

Trust plays a big role because relationship marketing theory says strong, lasting relationships depend on believing the brand can and will keep its promises. In this study, trust was closely linked to loyalty more than any other emotion and stayed important even when looking at many factors at once. This means that without trust, other positive feelings might not be enough to keep customers loyal over time. Satisfaction also has a strong effect, but it works differently. While trust is about how reliable and honest the brand is, satisfaction is about how well the brand meets what customers expect. These two emotions work together, with trust helping to build satisfaction and satisfaction making trust stronger, creating a strong emotional connection between the customer and the brand.

Storytelling plays a big role in building loyalty, both directly and by helping to build trust. This shows how important it is for brands to use emotional storytelling that goes beyond just telling people what a product does. Storytelling helps make brands feel more human, fits into the stories people tell about themselves, and shares values that people care about. This idea has been talked about a lot in branding research (Escalas, 2004; Gobe, 2001). The study here supports these ideas, showing that when brand stories match what people believe in and what they want, it makes them trust the brand more and stay loyal. This is important for brands to know: they should create stories that not only make people feel good or inspired but also show that the brand is real and dependable. The fact that storytelling affects loyalty through trust means that people are more likely to like stories that feel real and match their experience with the brand.

Visual appeal is also important for loyalty, but it doesn't have as big an effect as storytelling. Like what Henderson and Cote (1998) found, nice things like colours, fonts, and packaging can make people feel good, remember the brand better, and feel connected to it. In this study, visual appeal affects loyalty both directly and indirectly, through admiration. This means that while nice designs can make people feel emotionally connected, how well they work may depend on whether they make people admire the brand. So, brand design should not only look good but also carry meaning, showing quality, status, or cultural connections.

Even though joy, excitement, and admiration didn't have the strongest effect in the bigger picture, they still matter. In smaller studies, all three emotions were linked to loyalty, showing they help shape the emotional environment around a brand. However, when trust and satisfaction were taken into account, their direct effect on loyalty dropped. This suggests that these emotions can help boost loyalty, but they work better when trust and satisfaction are already there. Without that base, they aren't enough on their own. This aligns with Batra, Ahuvia, and Bagozzi's (2012) idea of brand love, where feelings of passion (like joy and excitement) are important, but they need a strong foundation of trust and commitment to last.

The ANOVA results add more depth by showing how loyalty develops differently in various categories. The higher loyalty scores for brands in hospitality and fashion suggest that industries where experiences are key or where brands help people express themselves might be better at creating emotional connections. In hospitality, frequent face-to-face interactions between customers and brand staff allow for building trust and satisfaction through personalized service, empathy, and consistent behaviour. In fashion, when a brand's image matches what a customer sees in themselves, it can create admiration and excitement, which strengthens loyalty by showing the brand represents their identity. Technology brands, on the other hand, show lower loyalty, possibly because of fast product changes and new releases, which can make people focus more on the newest things instead of staying loyal to one brand.

The structural equation modelling (SEM) results help explain this further by showing that trust and satisfaction act as important links between how brands communicate and how loyal customers are. Storytelling and visual appeal work best when they support these feelings, proving that just doing flashy or creative things isn't enough unless they are connected to real, trustworthy brand experiences. This idea matches what Beverland (2005) said—that being genuine is essential for lasting brand relationships. Even the most creative campaigns won't build long-term loyalty if they don't match the real behaviour of the brand.

Looking at different groups, the analysis shows that emotions affecting loyalty don't change much between genders, which supports the idea that the basic emotional reasons for loyalty might be the same for everyone. However, age does seem to influence excitement, with younger people more likely to be drawn to new and exciting experiences. This fits with Holbrook and Schindler's (1994) theory about how consumer preferences change over time. This means brands trying to reach younger audiences could benefit from using more dynamic and innovative ideas, while those targeting older customers might focus more on building trust and satisfaction through dependability and quality.

These findings also highlight a gap in previous research about how different positive emotions affect loyalty in various situations. By looking at several emotions and brand communication methods at the same time, this study gives a more complete picture of the emotional factors that shape loyalty. The results show that while all positive emotions help build loyalty, each plays a different role depending on the situation. Trust and satisfaction are essential and always important, but joy, admiration, and excitement can boost loyalty when things are going well, but they may not keep loyalty strong on their own.

From a business perspective, these findings offer practical advice. Companies should focus on building trust by keeping their promises, being open and honest, and making sure every customer experience feels reliable. Satisfaction can be improved by keeping product quality high, responding quickly to customer needs, and helping reduce any doubts people might have after buying. Storytelling should be used in a meaningful way, helping customers connect the brand with their own stories, while making sure it feels genuine and matches the brand's values. Visual elements should be designed to create admiration and show value, especially in areas where people buy to express themselves.

The connection between emotional factors and communication methods shows that loyalty efforts should be connected, not separate. For instance, a campaign that looks nice and has a good story will work better if it also builds trust and satisfaction through reliable products and excellent customer service. This overall approach matches how people experience brands through many different points of contact, and loyalty grows over time from all these experiences.

In theory, these results help us understand more about how consumers feel about brands, especially how different emotions play a role in building loyalty. The findings back up a model where trust and satisfaction are the main building blocks, and other positive feelings like joy or admiration help strengthen this connection. Communication methods, like storytelling and visual design, can act as tools to boost these key emotions. This model brings together ideas from attachment theory, brand love, and emotional branding, giving a clearer picture of how emotions work together to create lasting loyalty.

In short, these results show that emotional connection is not just an extra part of what makes a brand good it's really important in today's competitive market. Trust and satisfaction are key to keeping customers for a long time, but adding emotions like joy, admiration, and excitement can make the relationship with the brand even stronger. Using storytelling and attractive visuals can help create these emotions, but only if they are real and consistently shown. When brands use these ideas in their plans, they can create experiences that really connect with people, helping them both attract and keep customers in a tough market.

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RESEARCH

The Impact of User-Generated Content on Global v/s Local Brands – A Case Study on Forever 21 v/s Vero Moda

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Executive Summary

Abstract

This study looks at how user-generated content (UGC) influences how people see a brand, how engaged they are with it, and how likely they are to buy products. It compares two brands in the Indian market one global fast-fashion brand called Forever 21 and a more local, premium brand-named Vero Moda. UGC has changed digital marketing by letting customers take part in telling a brand's story, which makes the brand feel more real and trustworthy than traditional ads. Global brands usually get a lot of UGC, which helps them spread their message and follow trends. Local or niche brands, on the other hand, need to be careful about the UGC they use to keep their premium image strong.

The research uses a case study approach, comparing the two brands. It looks at data from e-commerce sites like Amazon, Myntra, Flipkart, Ajio, and Nykaa Fashion, as well as social media platforms like Instagram and YouTube. The data is analysed using content and sentiment analysis to look at product reviews, star ratings, hashtags, influencer partnerships, and how customers interact with the brands. The results show that Forever 21 has more UGC, which helps it reach more people but also shows some issues with how consistent people think about the quality of its products. Vero Moda has less UGC, but the content it gets is more uniform and matches its image as a more upscale brand, which builds more trust with customers. This study adds to what we know about digital marketing by showing how UGC can affect global and local brands differently, even within the same product category. It also gives marketers useful ideas on how to use UGC in ways that fit their brand's identity, what their audience expects, and how different platforms work. The research also highlights the need to balance the amount of UGC with its authenticity and quality to make sure it helps build a brand in a lasting way.

Keywords
Stock market, Fundamental analysis, technical analysis, IT companies, RSI, MACD, EMA.

Introduction

User-generated content (UGC) has become a key part of digital marketing, changing how brands connect with customers and build loyalty. Unlike traditional ads, which are made by professionals and go one way, UGC lets people share their own thoughts and experiences. This makes brand messages feel more real and trustworthy, which can strongly affect how people think and what they buy. In fashion, where how you look and what you wear matter a lot, UGC plays a big role in how brands are seen in busy and competitive markets.

The start of UGC can be traced back to the 1990s when people first began sharing product feedback online through forums and simple text reviews. As technology improved, the rise of smartphones, fast internet, and visual platforms like Instagram, TikTok, and YouTube made UGC more popular and diverse. Nowadays, people don't just write reviews-they create videos, share daily outfits, take part in brand challenges, and make interactive stories that show their experiences. This change has given more power to consumers, as they now rely more on what others say than on what companies promote.

Brands have noticed how powerful UGC can be and are using it in their marketing to build trust and connect with people. Studies show that consumers find UGC more trustworthy and easier to relate to than ads from companies. This trust comes from the fact that UGC feels more honest and shows real-life experiences. For example, online reviews help buyers understand how a product works and act as social proof, helping people decide to buy. Similarly, social media posts that show real outfits in fashion are more appealing than fancy ads. Because of this, UGC is now important for increasing engagement, keeping customers loyal, and boosting sales.

The fashion industry is a great place to study UGC because it's all about looks, self-expression, and following trends. Global fast-fashion brands and local premium brands use UGC in different ways, depending on their market, customers, and brand image. Brands like Forever 21 use a lot of UGC from a wide range of people. They encourage users to share content using branded hashtags, style challenges, and work with influencers. This helps them stay in the spotlight, keep up with trends, and attract young people who like inclusivity and affordable prices. But the high volume of UGC also means these brands might face inconsistent reviews and criticism about quality, which can weaken their image.

On the other hand, local or premium brands like Vero Moda take a more selective approach. They carefully pick UGC that fits their image of being elegant and refined. Rather than focusing on how much content they get, Vero Moda focuses on quality, showing content that reflects timeless style. Campaigns like "Style Me Up" let customers creatively show off their outfits while keeping the brand's image consistent. Even though Vero Moda gets fewer reviews and mentions than Forever 21, what they do get is more consistent and positive, matching their position as a premium brand. This careful selection helps build trust and attract a loyal group of customers who care about exclusivity and quality.

E-commerce sites have made UGC even more important in how people make buying decisions. Reviews and ratings on platforms like Amazon, Flipkart, Myntra, Ajio, and Nykaa Fashion directly influence what people buy. A good rating or detailed review can make a product more visible and trustworthy, while having few reviews can make people unsure. Forever 21 often gets a lot of reviews that show different opinions about quality, fit, and value, but this can also point out problems like size issues or material concerns. Vero Moda, on the other hand, gets fewer reviews, which might limit how visible they are but also shows that when people do review, they are happy with the product. This shows how the amount and consistency of UGC can lead to different brand outcomes.

Social media platforms offer an extra way for user-generated content (UGC) to connect products with people's lifestyles and build communities. For example, Instagram lets brands share customer photos and use special hashtags to get people involved. Forever 21 uses this by focusing on inclusivity and current trends, while Vero

Moda carefully chooses which user content to share to keep its brand image high-end. YouTube is another place where people share long-form UGC, such as shopping lists, style advice, and product reviews. Forever 21 works with influencers to make trends popular, while Vero Moda chooses specific influencers to connect with cultural values and create a sense of aspiration. These different approaches show how the way platforms work and how brands position themselves affect their UGC strategies.

Even though UGC has benefits, it also brings challenges for brands. One big issue is that brands can't always control the quality or how the message comes across. Bad reviews, mixed-up product images, and fake influencer ads can harm a brand's reputation. Also, legal and ethical issues can make using UGC tricky. In the US, the Federal Trade Commission (FTC) requires clear labels for paid partnerships, and in India, the Advertising Standards Council (ASCI) has similar rules. Brands that don't follow these rules can lose trust, which weakens the real feel of UGC. So, managing UGC needs a balance between letting people share freely and making sure the content stays genuine and matches the brand's standards.

This study looks at these complexities by comparing how UGC affects two different fashion brands, Forever 21 and Vero Moda, in the Indian retail market. The comparison shows differences in the amount of UGC, how consistent it is, how people see it, and how each brand uses it on different platforms. This helps understand how UGC works in both global and local settings. By looking at reviews, ratings, social media activity, and influencer work, the research explores both the good and bad sides of UGC in the fashion industry.

The study has three main goals. First, it compares the types of UGC on e-commerce sites and social media for both brands. Second, it looks at how UGC affects how people see the brand, their emotional connection, and whether they want to buy. Third, it finds out what makes UGC work well for engagement and loyalty, helping marketers improve their strategies. By achieving these goals, the study adds to knowledge about consumer behaviour and marketing, and also gives practical advice for brand managers dealing with the fast-changing digital world.
The research sees UGC as more than just a tool for promotion. It acts as a key part of the relationship between consumers and brands, helps build trust, and affects how competitive a brand is in the market. As the digital world keeps changing, understanding UGC will stay important for fashion retailers wanting to stand out, build stronger connections with customers, and succeed in a crowded market.

Literature Review

User-generated content (UGC) has become a key topic in marketing and consumer behaviour studies because of its impact on building trust, increasing engagement, and influencing buying choices. UGC refers to digital content that people create on their own, not as part of a job or business, such as reviews, photos, videos, blogs, and social media posts. It is seen as more trustworthy and unbiased compared to company-made ads, which helps explain why it is so powerful. Many researchers agree that this sense of authenticity makes UGC more effective than traditional marketing messages, especially in industries where trust and community are important, like fashion retail.

The roots of UGC go back to the early 1990s when online forums and e-commerce sites started featuring text-based product reviews. These allowed consumers to share their thoughts and experiences with others beyond their immediate circles. As technology advanced, the rise of platforms like Instagram, YouTube, and TikTok transformed UGC into a multi-media experience. People now share not just text but also photos, style tips, short videos, live streams, and interactive stories. This change shows wider trends in how we communicate online, including shorter attention spans and the growing need for visually engaging content. As a result, UGC has moved from being a small part of consumer feedback to a central part of how brands build their identity and influence customers' buying decisions.

One common idea across many studies is that UGC is more credible than traditional ads. (Smith, 2012) says that consumers find UGC more real and relatable, which makes it more persuasive. Research also shows that the

credibility of the source is important in whether UGC affects consumer opinions. (Cheung, 2009) suggests that trust and expertise help determine the credibility of UGC, while (Metzger, 2013) argues that people often use simple rules, like what others say or their past experiences, to judge if online content is reliable. (Filieri, 2015) adds that reviews that are clear, detailed, and easy to understand have a stronger effect on buying decisions. On the other hand, vague or overly technical reviews can cause confusion, making consumers ignore the content or even avoid the brand.

Experts also highlight the role of UGC in shaping how people see a brand and where it stands. Bruhn, (Bruhn, 2012) found that UGC increases brand awareness and improves how people view the quality of a brand. Nguyen et al. (2019) confirmed that when UGC is trustworthy and easy to understand, it helps a brand stand out in competitive markets. (Auxier, 2021) expanded on this by linking credible UGC to long-term brand loyalty, suggesting that stories created by users not only encourage people to buy something now but also make them more likely to come back. (Dwivedi, 2023) also noted that big global brands use a lot of UGC to increase their visibility, while smaller or specialized brands use UGC that matches their cultural context to connect with specific audiences. These findings show that UGC isn't a one-size-fits-all approach but works differently based on how a brand positions itself and the market it's in.

The effect of UGC on consumer buying decisions has also been widely studied. (Erkan, 2016) observed that when people see useful and credible UGC, they are more likely to make a purchase. (Park, 2007) emphasize that online reviews give both information and social validation, helping customers feel more confident before buying. Studies on Tokopedia, an Indonesian e-commerce site, found that reliable and knowledgeable UGC strongly predicts buying behaviour, especially in lifestyle areas like fashion and travel. (Ahmad, 2021) also noted that the number and tone of reviews influence consumer responses; more positive reviews increase trust in a brand, while negative ones reduce it.

Beyond personal choices, user-generated content (UGC) also helps build brand communities. (Muniz Jr, 2001) say that when people create and share content about a brand, they often feel like they're part of a bigger group, which strengthens their connection to the brand. (Rios de Castro Marques, 2020) found that Instagram hashtags and brand challenges encourage people to join in shared activities, making their feelings towards the brand stronger. The way different platforms work is important too: Instagram is great for quick, eye-catching stories, while YouTube is better for longer videos like unboxings, hauls, and style guides. These findings show that the type of UGC used can affect not just how much people engage with a brand, but also the kind of relationship that develops between the consumer and the brand.

Fashion retail is a great area to study UGC because it focuses a lot on looks, trends, and how people present themselves. Brands like Forever 21 use UGC a lot to stay relevant in fast-changing markets. They run campaigns like F21xMe, where customers share their fashion choices, which fits with their image of being affordable and inclusive. This helps them reach a wide audience. On the other hand, premium brands like Vero Moda use a more selective approach. Their campaigns like "Style Me Up" ask customers to show off their creativity, but only high-quality content that matches the brand's image is featured. This focuses on aspirational values, even though it results in fewer entries. Kumar et al. (2022) found that this kind of carefully chosen UGC, while not as widespread, tends to create stronger emotional connections with specific groups, showing the trade-off between reach and relevance.

Despite the benefits, UGC has its drawbacks. (Christodoulides, 2012) warn that brands can't control the quality or consistency of user-generated content, which can lead to issues like bad reviews or mixed messages. This can hurt the brand's image, especially for fast-fashion companies that face criticism over product quality. Also, different rules around UGC make it harder to use it in marketing. The U.S. Federal Trade Commission (FTC) requires clear labels for paid promotions, while India's Advertising Standards Council (ASCI) demands transparency in

influencer work. Not following these rules can damage consumer trust, which is key to UGC's effectiveness. To manage these risks, brands have to balance being genuine with some level of control.

While there is a lot of research on UGC, there are still gaps in what we know. Most studies look at global or local brands separately, without comparing them in the same product category. This makes it hard to see how different brand sizes and positions affect the success of UGC. Also, many studies focus on one platform instead of looking at multiple platforms. However, consumer interactions on shopping sites are different from those on social media, and insights from one place may not fit in another. Another gap is in how research is done: many studies look at either numbers like star ratings or the tone and visuals in content, but rarely combine both. This limits our ability to fully understand how UGC affects consumer behaviour.

This study aims to address these gaps by looking closely at UGC in fashion retail. It compares two different brands Forever 21, a global fast-fashion brand, and Vero Moda, a locally focused premium brand to show how brand positioning affects UGC strategies and results. The study covers various platforms, including e-commerce sites like Amazon, Myntra, Flipkart, Ajio, and Nykaa Fashion, as well as social media platforms like Instagram and YouTube. This wide range helps understand how UGC functions in different types of spaces. Lastly, the study mixes both quantitative and qualitative methods, looking not just at ratings and engagement levels but also at content quality, tone, and themes. By filling these gaps, the study contributes to both academic discussions and real-world marketing strategies, giving insights on how brands can better use UGC to improve trust, engagement, and loyalty.

Research Methodology

This study uses a comparative case study approach to look at how user-generated content (UGC) affects global and local fashion brands, specifically Forever 21 and Vero Moda, within the Indian retail market. The research combines both exploratory and descriptive methods to understand new trends in UGC and describe how consumers behave online. By using data from various online sources, the study captures real consumer interactions and provides insights that reflect how people actually engage with brands in everyday situations.

A case study was chosen because it allows for a detailed comparison between two brands that have different positions in the market. Forever 21 is a global fast-fashion brand known for being affordable, inclusive, and always on trend. Vero Moda, however, is a premium brand that's mainly focused on the Indian market, offering elegant and exclusive styles. By comparing these two brands, the study shows how UGC behaves differently based on the brand's size, audience, and positioning. This comparison helps uncover similarities, differences, and the effects of context on how consumers interact with brands.

The research is driven by the growing importance of UGC in the fashion industry for building trust, authenticity, and customer loyalty. Even though many brands use UGC, there's not much academic work that directly compares how it affects global and locally focused premium brands in the same product category. This lack of information makes it hard for marketers to use UGC strategies in ways that match their brand image and what customers expect. To solve this, the study looks at how UGC works in different situations and across various platforms.

The study covers UGC related to Forever 21 and Vero Moda on five major e-commerce sites Amazon, Myntra, Flipkart, Ajio, and Nykaa Fashion and two popular social media platforms Instagram and YouTube. These platforms represent both transactional and community-based online spaces where UGC is common. E-commerce sites let customers leave direct comments and star ratings, while social media allows users to post lifestyle content that connects personal identity with brands. Including both types of platforms gives a full picture of how UGC influences consumer behaviour.

The study has three main goals. First, it looks at how UGC differs across platforms for both brands, focusing on

the amount, tone, and topics covered. Second, it examines how UGC affects brand image, emotional connection, and the likelihood of a purchase, assessing its strategic value. Third, it identifies key factors that make UGC more effective, giving marketers useful strategies that fit with their brand positioning. These goals aim to provide both theoretical knowledge and practical guidance.

Data was collected using secondary sources to ensure the findings are realistic and relevant to real-world situations. Reviews and ratings from e-commerce platforms were analysed, including numerical scores and written comments that covered aspects like product quality, fit, transparency, and value. Social media data from Instagram and YouTube were gathered by examining posts, comments, hashtags, influencer partnerships, and video content. Hashtags like #F21xMe, #Forever21, #VeroModaLove, and #VeroModaStyle were tracked to understand how consumers engage and participate. YouTube content included brand ads, styling guides, haul videos, and reviews, offering insights into how longer-form content works.

This method made sure that the sample was representative by choosing content from different product types and campaign periods. This helped avoid any favouritism towards certain collections or sales events. Since the data came from real customer actions, it gave a true picture of how people interact with brands without any researcher interference. Even though this study didn't collect primary data, using naturally occurring secondary data allowed for a more unbiased view of consumer behaviour.

The way we analysed the data used both numbers and words. The numbers looked at things like star ratings, how many reviews there were, how many user-generated posts there were, and how much people engaged with content. Engagement was measured by dividing the number of likes, comments, and shares by the total number of followers or subscribers, giving a better idea of how much people were interacting with content than just counting how many times something was shared. This helped compare how UGC affected different brands based on their visibility.

Looking at words and images involved categorizing them into themes. Reviews were checked for words like “trendy,” “affordable,” “sophisticated,” or “poor fabric,” while visual content was looked at for style, how well it matched the brand, and how much it fit with current fashion trends. Instagram posts were studied for how real and relatable they were, and YouTube videos for how deep the engagement was, how the stories were told, and how much they connected with culture. We also used sentiment analysis to see if the content was positive, negative, or neutral, helping us understand the overall feelings about brands on different platforms.

To make the study more solid, we used a method called triangulation by looking at multiple platforms at the same time. This helped reduce any bias from one platform and made the insights more reliable. For example, Amazon and Myntra reviews were checked together to find common themes, and Instagram and YouTube content were compared to see if brand images were consistent between visual and video formats. Triangulation also made sure findings were not skewed by the unique rules or user groups on each platform.

The process of organizing the data followed established methods from UGC studies, such as those by Filieri (2015) and Anderson (2021), which stress the importance of clear, trustworthy, and emotionally engaging content. These methods helped sort the content into groups like quality of information, emotional appeal, and cultural fit. This structured approach let us interpret different types of content evenly and thoroughly.

To improve accuracy, we checked our methods carefully. We made sure the sample included content from various product types like dresses, casual clothes, and accessories, so our insights didn't Favor certain items. We kept the same categories across all platforms and brands to keep the coding consistent. We also made sure to follow ethical rules by only using public content and not including any personal information. Focusing on overall trends instead of individual users helped keep the research ethical and respected digital privacy.

Even with these steps, the method had some limits. Since we only used existing data, we couldn't control how detailed or accurate the reviews were. Some platforms had lots of reviews, while others had very few, leading to uneven data. The way platforms like Instagram and YouTube show content may have affected what UGC we saw, possibly introducing some bias. Also, the data only covered a specific time period, so changes over seasons or long-term trends might not have been fully captured. The absence of Forever 21 on certain platforms like Ajio also made direct comparisons more difficult.

Despite these challenges, the study's design as a comparative case study fits well with the research goals. By using real consumer-generated data, it gives a more natural and realistic view of how people interact with brands, avoiding the artificial setup that often comes with experiments. Looking at multiple platforms broadens the understanding of how UGC impacts brands and allows for a detailed analysis of its effects. The comparison between Forever 21 and Vero Moda gives insights that go beyond individual brand strategies, highlighting broader trends in the global and local fashion retail industry.

This structured method gives a good way to handle the research questions. It shows how UGC appears on different digital platforms and explains how brand positioning and customer expectations influence its effects. By mixing detailed numbers with in-depth analysis, this method gives a fair and balanced look at UGC, making the findings both strong for academic use and helpful for marketers and brand managers looking to understand consumer behaviour.

Data Analysis

The study looks at user-created content for Forever 21 and Vero Moda across online shopping sites and social media. It finds different ways these brands interact with customers, how people feel about them, and how their images are shaped. By looking at customer comments, star ratings, hashtags, influencer work, and images, the research shows how each brand uses user-generated content and where they face problems. The results explain how the differences in how each brand presents itself one being a global fast fashion brand and the other a local high-end brand affect the amount, mood, and impact of user content in the Indian retail market.

User-generated content on e-commerce sites shows how customers look at products through reviews, star ratings, and written comments. These interactions give a lot of information about how well a product works, how it fits, and how happy customers are. Comparing Forever 21 and Vero Moda on sites like Amazon, Myntra, Flipkart, Ajio, and Nykaa Fashion shows the link between how many reviews there are, what people feel about them, and how much trust they build.

On Amazon, Forever 21's products have a small number of reviews but mixed opinions. For instance, the Women's Bodycon Mini Dress had an average rating of 2.9 out of 5 based on four reviews. Some people liked the trendy look, but others said the fabric was too thin, leading to different views on quality. Vero Moda, however, had no reviews for a similar product during the same time. The lack of feedback makes it hard for customers to judge how reliable a product is, which limits the brand's reach and makes buying decisions less supported by others' experiences. This difference shows how having more reviews can help build trust, even if they're not all positive, and how not having any at all can create doubt and uncertainty.

Figure 1: Average Ratings of Forever 21 vs. Vero Moda on Amazon

On Myntra, Forever 21's orange one-shoulder bodycon dress received a strong average rating of 4.3 from ten buyers. Customers liked how it fit, the length, and how well it suited different skin tones, showing that the brand successfully included a wide range of people. On the other hand, Vero Moda's pink sleeveless midi dress had a lower average rating of 3.0 from 27 buyers. Even though the fit and length were often called "just right," 67 percent of customers mentioned that the fabric was somewhat transparent, which made them worry about the quality. The reviews were split, with many people giving either one star or five stars, which shows that people had very different experiences. While Forever 21 had mostly positive feedback, Vero Moda struggled to meet customer expectations even though it's seen as a more premium brand.

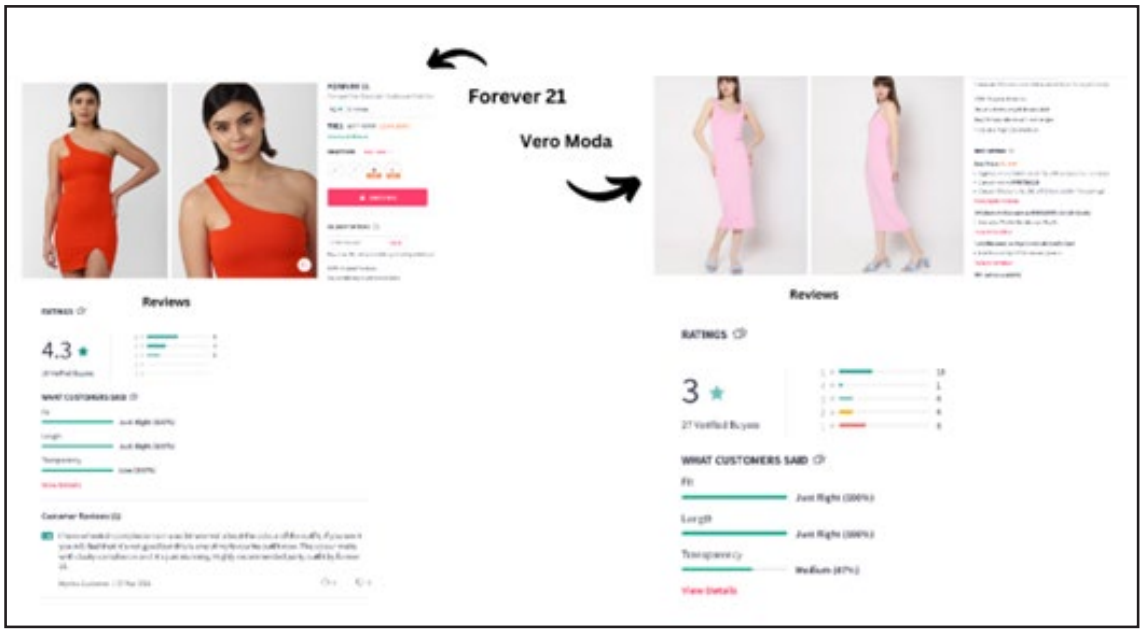

Figure 2: Star Ratings Distribution on Myntra

On Flipkart, Forever 21's beige bodycon dress had a high average rating of 4.5 out of 5 based on twelve reviews, but there were no written comments with the scores. The high number shows people were generally happy, but it doesn't talk much about what exactly was good or bad about the product. In contrast, Vero Moda's floral off-the-shoulder dress got only three ratings, averaging 2.3. Without any written feedback, the low score might make people hesitant to buy. This difference shows both brands face issues: Forever 21 has high ratings but lacks detailed feedback, while Vero Moda has low visibility and a poor impression.

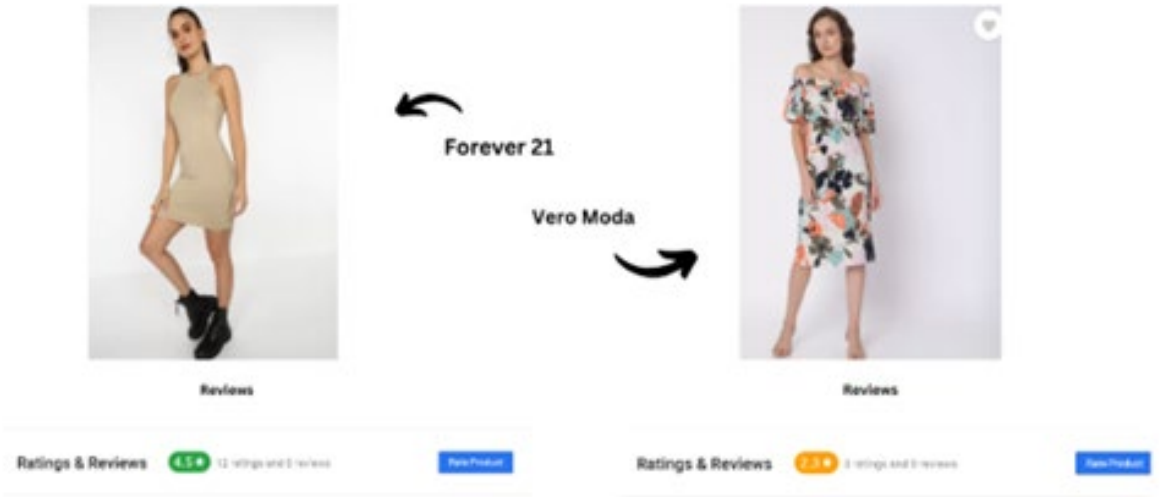

Figure 3: Comparative Average Ratings on Flipkart

On Ajio, Vero Moda's Heathered Bodycon Dress had an average rating of 3.0 out of 5 based on two reviews. Customers generally liked the quality of the product, but they had different opinions on how it fit some found it too loose, while others thought it was perfect. These mixed opinions pointed to a problem with sizing standards, which is something that often happens in the fashion industry. Forever 21 wasn't listed on Ajio during the time we checked, which might be because of exclusive deals or partnerships with the platform. Its absence made it harder for customers to engage with the brand on this site, showing how the way brands distribute themselves on platforms can affect what users say about them.

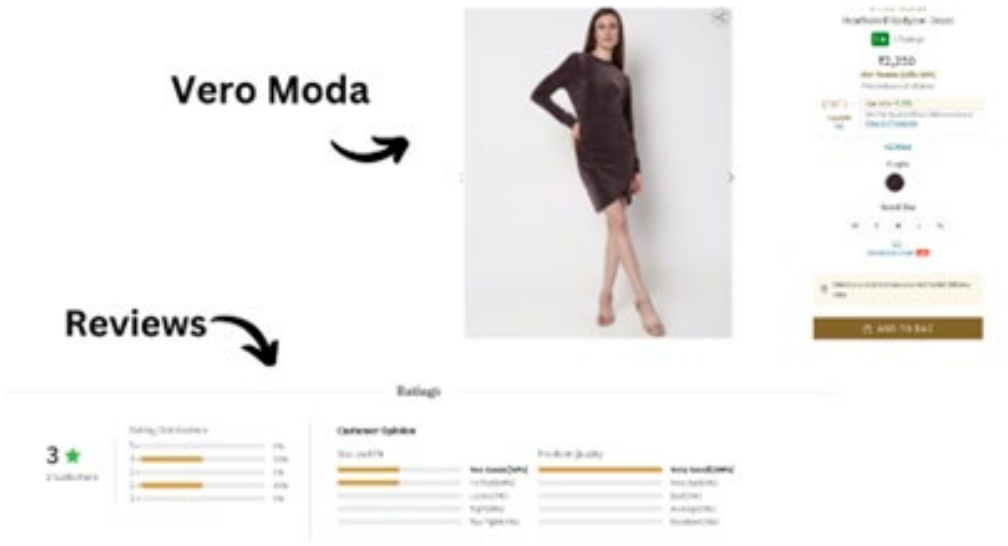

Figure 4: Fit Perceptions of Vero Moda Dresses on Ajio

On Nykaa Fashion, Forever 21's multicoloured dress got an average of 4.0 from eight reviews. People liked how it fit and looked, but they also mentioned that some items arrived damaged, suggesting problems with quality control. Vero Moda's pink dress had a slightly better rating of 4.2 from four reviews, with every customer praising both the fit and the style. Even though there were fewer reviews, the fact that all of them were positive made the brand seem more reliable. This example shows that a smaller group of consistently happy customers can have a bigger impact than a larger number of mixed reviews, especially for brands that depend on their reputation.

Figure 5: Comparative Ratings on Nykaa Fashion

E-commerce Findings Summary

Across different platforms, Forever 21 has more customer reviews, which helps it gain more attention and trust. However, it also gets criticized for having inconsistent product quality. On the other hand, Vero Moda has fewer reviews, which means it doesn't get as much visibility, but when the reviews are positive and consistent, it can still do well. For global fast-fashion brands, having a lot of reviews can be both good and bad — it can highlight strengths but also expose weaknesses. For local premium brands, having fewer but well-aligned reviews can make them seem more exclusive, though the lower visibility might make customers hesitate to buy.

UGC on Social Media Platforms

Social media platforms offer a different way for users to share content about brands. Here, people interact with brands not just by giving reviews, but also by sharing lifestyle stories, expressing their identity, and being part of communities. Instagram and YouTube are the most powerful platforms for shaping conversations about Forever 21 and Vero Moda.

On Instagram, Forever 21 uses a strategy that focuses on inclusivity and a large volume of posts. With over 17 million followers worldwide, the brand mixes professional content, influencer partnerships, and user-generated posts. Hashtags like #F21xMe encourage customers to show off their outfits, creating a lively community. This helps the brand feel approachable, trendy, and connected. But because there are so many posts, the engagement rate per post is lower, meaning that having a wide reach can come at the cost of deeper connections.

Vero Moda India, in contrast, has a smaller but more carefully chosen Instagram presence with around 600,000 followers. The brand focuses on keeping its look consistent and maintaining a premium image, sharing only high-quality user-generated content that matches its elegant and sophisticated brand image. Hashtags like #VeroModaLove and #VeroModaStyle highlight the brand's focus on style and creativity, which reinforces its aspirational value. Even though the number of interactions is less than Forever 21's, the engagement rate per follower is higher, showing that customers are more committed to the brand.

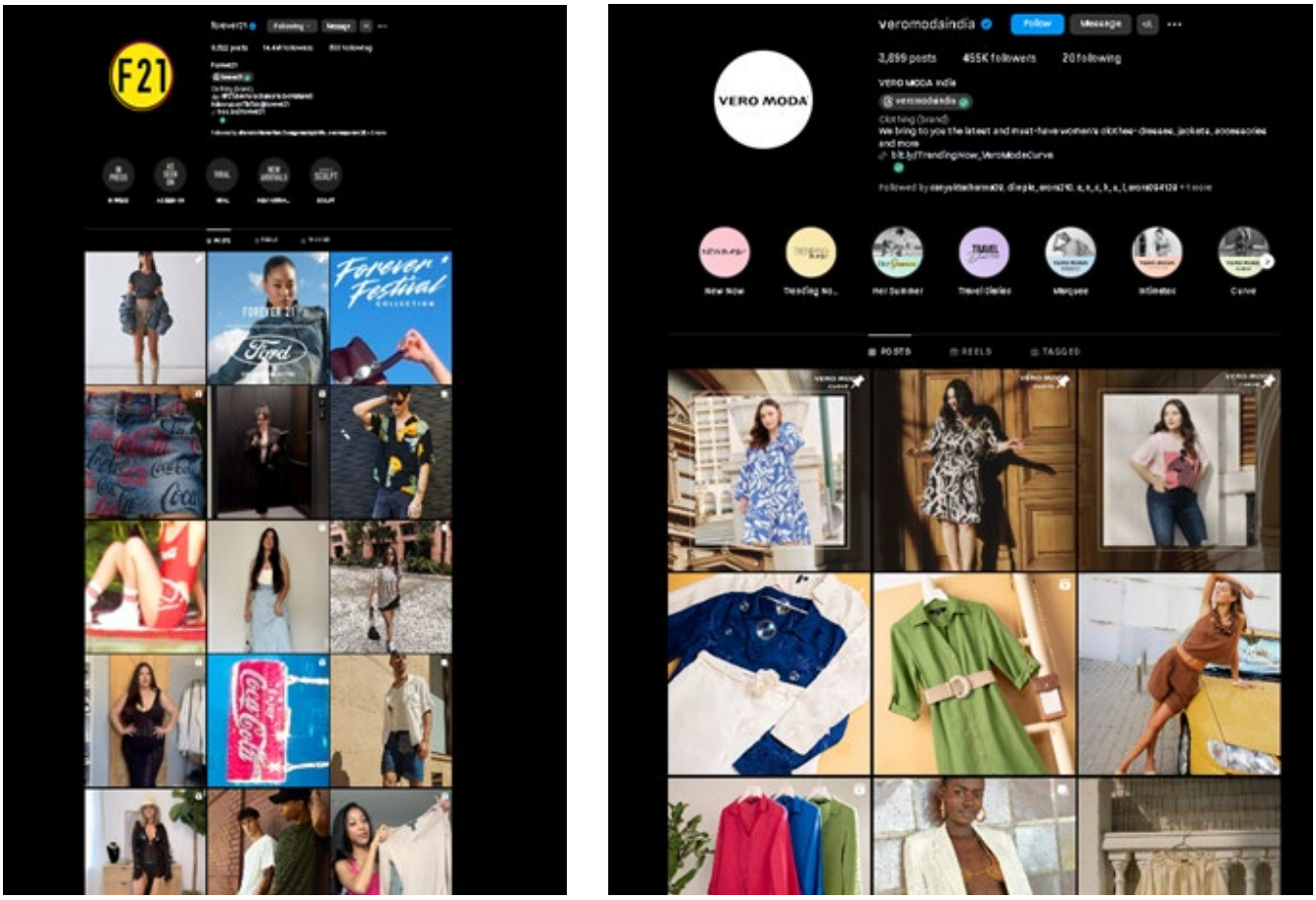

Figure 6: Instagram Engagement Rate Comparison

On YouTube, Forever 21 uses the platform to run campaigns, work with influencers, and share style guides that focus on current trends. Influencers show off their shopping hauls and seasonal outfits, which get a lot of views and help the brand reach more people. But the focus on quick, trend-based videos can sometimes reduce long-term impact. Engagement tends to be high initially but doesn't last as long as the next trend comes along.

Vero Moda uses YouTube in a different way, focusing on content that feels timeless and aspirational, which matches its image as a premium brand. They work with smaller influencers who emphasize versatile styles, cultural relevance, and real authenticity. Campaigns like "Style Me Up" let customers create their own styling videos, making the brand seem more interactive and community-driven, even though it's still seen as premium. The engagement per video, compared to the number of subscribers, is often as good as or better than Forever 21's, showing a loyal, though smaller, group of followers.

Comparative Synthesis of Findings

Looking at Forever 21 and Vero Moda across e-commerce and social media platforms, three main ideas stand out: the balance between quantity and consistency, how each platform affects engagement, and how brand positioning shapes user-generated content.

First, the balance between quantity and consistency is a key difference. Forever 21 has a lot of user-generated content, which helps it get more attention, shows a range of experiences, and feels more inclusive. However, this also means there can be inconsistencies, especially when it comes to product quality. On the other hand, Vero Moda has less user-generated content but keeps things consistent and in line with its premium image. People see the brand as reliable and elegant, although fewer reviews make it less visible. The results suggest that big brands benefit from lots of content but must be careful not to lose quality. Local premium brands, meanwhile, gain from

being selective but need to make sure they're still seen by enough people.

Second, how well content works on each platform depends on what's being shared. On e-commerce sites, the number of reviews plays a big role in buying decisions. Forever 21 uses quantity to spread awareness, while Vero Moda uses quality to build satisfaction. On social media, Instagram is all about showing lifestyle and community, which suits global brands with inclusive content and premium brands that focus on careful curation. YouTube, on the other hand, is great for storytelling, where Forever 21 leads trends and Vero Moda highlights long-lasting value. This shows that user-generated content's effectiveness depends not just on the brand itself but also on the platform where people interact.

Third, how a brand positions itself in the market significantly affects user-generated content. Forever 21, as a global fast-fashion brand, is all about being accessible, affordable, and diverse. Its user-generated content feels spontaneous and welcoming, which appeals to a wide audience. Still, its reputation can suffer when quality issues are mentioned in reviews. Vero Moda, as a premium brand, is about exclusivity, elegance, and cultural fit. Its user-generated content feels carefully chosen and aspirational, appealing to a more niche group. However, its limited presence in conversations about fashion means it doesn't stand out as much as it could.

The results show that user-generated content is important for shaping how consumers see a brand, how engaged they are, and whether they decide to buy. But its effectiveness depends on the brand's identity, the platform used, and what customers expect. Global brands need to balance inclusivity with quality control, while local premium brands should find ways to increase visibility without hurting their image. The comparison highlights that both brands gain from user-generated content, but they do so in different ways that reflect their market roles and audience expectations.

Discussion

The study's results give important information about how user-generated content (UGC) affects how people see a brand, how engaged they are, and how likely they are to buy from both global and local fashion brands. By looking at Forever 21, a global fast-fashion company, and Vero Moda, which is more focused on the local market and has a premium image, the research shows how different brand identities, market positions, and what customers expect influence the amount, tone, and effectiveness of UGC on online shopping sites and social media. This discussion explains what these findings mean, what they suggest for brand strategies, and how they fit into the bigger picture of UGC in India's retail environment.

One main idea that comes up is the balance between having a lot of UGC and keeping it consistent. Forever 21 has a large amount of UGC on both e-commerce sites and social media, which makes it more visible and helps it stay relevant with current trends. The many reviews and posts create a steady stream of consumer stories, keeping the brand at the centre of fashion discussions. However, this high volume also brings inconsistencies in product quality, with negative reviews about fabric or sizing making positive experiences less convincing. Consumers see these issues as signs of possible problems, which reduces trust even though the brand is well-known. Vero Moda, on the other hand, has much less UGC. This lower amount means it isn't as visible in the busy digital world, but when there are reviews and posts, they match its premium positioning. Because customers choose to engage with the brand, the UGC that appears is usually consistent, positive, and coherent. This shows that global fast-fashion brands need to focus on handling quality issues to keep their reputation strong, while local premium brands should find ways to increase their visibility without losing their image as aspirational.

Another key point is how engagement works differently on various platforms. On e-commerce sites, having a lot of reviews builds trust. Forever 21's high number of reviews gives potential buyers more information, reducing their doubts and encouraging them to try the affordable products. Even if the reviews are mixed, the presence of many opinions makes the brand seem more reliable. Vero Moda's fewer reviews, however, make it harder for customers

to decide to buy. People are hesitant to spend on premium items without seeing others' experiences, highlighting how visibility on e-commerce platforms is key to turning interest into sales. Social media platforms, on the other hand, value quality, stories, and authenticity more than just quantity. On Instagram, Forever 21 uses inclusivity and popular trend-related hashtags to connect with a wide audience, while Vero Moda uses carefully chosen, high-quality images to support its premium image. On YouTube, Forever 21 focuses on influencer videos and seasonal campaigns, while Vero Moda highlights classic styling and cultural significance. These findings show that brand managers need to adjust their UGC strategies for each platform: focus on quantity and variety in transactional areas, and emphasize curation and coherence in lifestyle-focused spaces.

The third theme is about how brands position themselves and what consumers expect from them. Forever 21, as a fast-fashion brand, depends on being easy to access, affordable, and quick to follow trends. The user-generated content (UGC) from this brand shows a lot of spontaneity, inclusivity, and diversity, which appeals to a wide audience that likes to try new trends often and buy things at lower prices. However, this way of positioning the brand can be risky when UGC points out issues with product quality or environmental impact, as consumers still expect the brand to be reliable even at lower prices. On the other hand, Vero Moda relies on exclusivity, elegance, and sophistication. The UGC they get reflects carefully chosen, aspirational values that attract a smaller, more selective group of customers who value style and reliability more than price. But this approach can make the brand less visible, especially since there aren't as many reviews or posts. Consumers expect high-end brands to always deliver consistent quality, and even small mistakes in UGC can hurt long-term trust. These findings show that UGC isn't the same for all brands; it depends on how well a brand's positioning matches what its customers expect in the digital world.

Conclusion

These patterns match and expand what's already known about UGC. Earlier research highlights how UGC is more trustworthy than traditional ads, helping to build trust in a brand (Smith et al., 2012; Filieri, 2015). This study supports that trust-building effect, but also points out the tricky part: a lot of UGC can build trust by being visible, but it can also damage trust if it shows inconsistencies. Past studies also show that UGC helps create brand communities and emotional connections (Muniz & O'Guinn, 2001; Marques et al., 2020). This study adds more depth by showing how community-building works differently depending on the size of the brand: big brands like Forever 21 depend on inclusivity and following trends, while high-end brands like Vero Moda focus on creating a small, curated sense of connection through aspirational stories. These differences show the importance of looking at UGC not as a one-size-fits-all tool, but as something shaped by the brand's identity and its market.

The findings also show the challenges that brands face when using UGC. For Forever 21, the main challenge is balancing inclusivity with maintaining quality. While a lot of UGC can boost visibility, it can also spread criticism quickly across digital channels, harming trust. Negative comments about fabric quality or inconsistent sizing can spread fast, which makes it harder for the brand to keep its customers' trust. The brand has to invest in quality control, good customer service, and active engagement to manage these risks. At the same time, it must continue creating inclusive campaigns to keep customers interested and ensure the UGC ecosystem stays lively. For Vero Moda, the challenge is about making the brand more visible without losing its exclusive and aspirational value. Because there aren't many UGC posts, potential customers might be unsure if the brand is worth buying from. The brand needs to encourage more user involvement, maybe by offering rewards for reviews or working with micro-influencers, while making sure the shared content still fits the brand's image. Success for Vero Moda depends on finding the right balance between being exclusive and being seen.

Another key takeaway is the role of authenticity in how customers view brands. On platforms like Instagram, people are more engaged with content that feels real and relatable. Forever 21 uses hashtag campaigns to involve users, but because there are so many contributions, it's harder to control the quality. Some posts feel real and authentic, while

others look staged or influenced by paid promotions, which can make people less trusting. Vero Moda, in contrast, keeps things authentic by only sharing high-quality UGC that matches its brand image. Even though this limits the volume of content, it helps maintain the perception of reliability and elegance. These findings suggest that brands should actively manage the authenticity of UGC by setting clear guidelines, encouraging genuine participation, and avoiding too much commercialization.

The comparison also gives us a better understanding of how consumers behave when shopping for fashion online. They depend a lot on content created by other users to judge how good a product is, especially when they can't try it on first. On online stores, they usually look at star ratings and written reviews to decide if a product is trustworthy, often putting other people's opinions before what the brand says. On social media, they check whether a brand fits with their lifestyle and whether it shows who they want to be. Forever 21 appeals to people who love trying new things and want affordable options, while Vero Moda attracts those who care more about reliability and style. User-generated content helps consumers understand both the practical and symbolic parts of fashion brands, which not only affects buying choices but also builds long-term loyalty.

From a business point of view, the results suggest several useful approaches. First, global fast-fashion brands like Forever 21 need to improve their quality control to avoid damage to their reputation caused by a lot of user-generated content. They should also track what people are saying and respond quickly to negative comments, turning complaints into chances to improve. Second, local premium brands like Vero Moda should encourage more customer involvement without making the brand seem less exclusive. Programs that reward reviews, working with micro-influencers, and running interactive campaigns can help the brand get more attention while keeping its aspirational image. Third, both types of brands should develop UGC strategies that fit each platform: focus on quantity on e-commerce sites, care about quality on Instagram, and create deep, meaningful stories on YouTube. This approach ensures that UGC works well by matching what consumers expect in different digital spaces.

These findings also have implications beyond the fashion industry. They show that UGC works differently in different product areas based on the features of the product and how the brand positions itself. In fast-moving consumer goods, the amount of UGC may be more important because people buy these items often, while in higher-end areas like luxury or electronics, consistency and trust may be more important. These insights can help marketers in other industries create UGC strategies that match their brand’s role in the market.

Although this study has some strengths, the results should be taken with care because of some limitations. The use of secondary data made it hard to control the content of reviews or the platform's algorithms, which might have affected how visible UGC was. The study looked at a specific time frame, which limits how broadly the results can be applied across different seasons. Additionally, the absence of Forever 21 on Ajio limited full comparison across platforms. Future research should address these gaps by using primary data, studying other premium brands, and using long-term studies that show how UGC patterns change over time. Comparing across different cultures could also add more depth to our understanding by showing how UGC dynamics vary in different global markets.

This study shows that UGC plays a key role in shaping how consumers see a brand, how much they engage with it, and how likely they are to buy something, whether the brand is global or local. However, its effectiveness depends on the brand's position, what consumers expect, and how the platform works. Forever 21 benefits from having a lot of content but struggles with being inconsistent, while Vero Moda benefits from staying consistent but struggles with being seen enough. On e-commerce sites, the number of reviews builds trust, while on social media, carefully selected authenticity keeps the brand identity strong. The findings highlight that there is no one-size-fits-all way to handle UGC: the strategies need to balance visibility with reliability, inclusivity with exclusivity, and breadth with depth.

The broader value of this research is in viewing UGC as a strategic resource rather than just a marketing tool. UGC

helps build trust, creates a sense of community, and supports brand stories, making it a central part of modern marketing. For global fast-fashion brands, success means managing quality while keeping things inclusive. For local premium brands, success means increasing visibility without losing the aspirational value. Both paths show how complex UGC is as a way to build brand value and consumer loyalty. As digital environments keep changing, brands that use UGC smartly will not only stand out in competitive markets but also build lasting connections with their customers.

Limitations and Future Research

Although this study offers valuable insights into how user-generated content (UGC) affects brand image and consumer behaviour, there are several limitations that need to be considered to properly understand the results. These limitations are mainly related to the data used, the research methods, how platforms work, and the challenge of applying the findings to different situations. Recognizing these limits is important for accurately interpreting the results and for guiding future research that can build on this study.

The first limitation is that the study only used data that was already created by users. It collected reviews, ratings, hashtags, and social media posts, which ensured that the content was genuine. However, this approach made it difficult to control the depth and spread of the data. Some e-commerce platforms, like Flipkart, only provided numerical ratings without written reviews, which limited the ability to understand why consumers gave certain scores. Also, the absence of Forever 21 on Ajio made it hard to compare data across platforms, leading to gaps in the dataset. Future research could improve this by using primary data collection methods like surveys, interviews, or focus groups. These methods would capture more about why consumers act the way they do, linking numerical patterns with deeper insights.

The second limitation is the time frame of the data collection. UGC is constantly changing, showing real-time experiences, campaign activities, and seasonal trends. The dataset in this study was a single point in time and did not capture longer-term changes in consumer attitudes. As a result, it might miss shifts in opinions related to different fashion seasons, product launches, or economic conditions. Future research should use long-term approaches to track UGC over time. This would help scholars understand if observed trends are temporary or ongoing in the relationship between consumers and brands.

Another limitation concerns the influence of platform algorithms and visibility bias. Platforms like Instagram and YouTube use algorithms that prioritize certain content based on engagement, recency, or advertising interests. These algorithms might have affected which posts or videos were seen during data collection, potentially favouring content that is more visible or sponsored. Similarly, e-commerce sites often highlight reviews based on helpfulness or how recent they are, which can create an inaccurate picture of consumer sentiment. Since the study couldn't control these algorithm-driven processes, the analysis might reflect what platforms choose to show rather than the full range of consumer opinions. Future research should find ways to reduce algorithmic bias, such as using tools that gather more content or working with platforms to get more complete data.

The fourth limitation is that the findings are limited to two fashion brands in the Indian market. While Forever 21 and Vero Moda offer interesting contrasts between a global fast-fashion brand and a locally positioned premium one, the results may not apply to other industries or cultures. Consumer reactions to UGC can vary greatly in sectors like electronics, luxury goods, or services. Additionally, UGC behaviour changes across countries due to different communication styles, trust levels, and social media habits. Future research should compare across industries and cultures to see just how general these insights can be. This would help determine if the balance between volume and consistency observed in this study applies broadly or is specific to fashion in emerging markets.

The methodology also faced challenges in measurement and interpretation. While engagement ratios provided a

more accurate measure of interaction than just counting numbers, they didn't fully reflect the emotional depth of consumer sentiment. For example, a high like-to-follower ratio on Instagram might show visibility, but not necessarily emotional connection or loyalty. Similarly, sentiment analysis of reviews categorized feedback as positive, negative, or neutral, but sometimes missed complex expressions like sarcasm or mixed feelings. Future research should use more advanced tools like natural language processing (NLP) and machine learning models to better capture the nuances of consumer expression.

Finally, this study points to opportunities for future research into new forms of UGC. With the rise of TikTok-style videos, live streaming, and virtual shopping, consumers interact with brands in more creative and interactive ways. These formats might change how UGC functions by combining entertainment, authenticity, and shopping experiences more seamlessly. Future studies should explore how these new formats influence trust, brand identity, and purchasing decisions, especially for younger groups that are more digitally fluent. Also, the growing focus on sustainability and ethical consumption invites examination of how UGC reflects or challenges brand commitments in these areas. For instance, do consumers support or question sustainability claims in their posts, and how do these narratives affect brand reputation? Exploring these questions would make UGC research more relevant to current marketing issues.

While this study adds to the understanding of UGC in fashion retail, it is still limited by data availability, time frame, algorithmic influence, and specific context. These limitations open up opportunities for future research to broaden methods, explore other industries, and include new digital formats. By addressing these gaps, future studies can enhance both academic and practical knowledge of UGC as a key factor in consumer engagement and brand loyalty in the digital era.

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RESEARCH

Optimizing Loom Planning and Scheduling: Enhancing Efficiency through Industry 4.0 Integration

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Executive Summary

Abstract

In order to ensure effective resource use and limited downtime. Loom planning and scheduling are essential elements of the textile industry. Classical scheduling techniques frequently result in production problems, greater costs and errors. In order to optimize loom scheduling and overall efficiency, the present research investigates the combination of industry 4.0 technologies including internet of technology AI driven maintenance forecasting and real time data analytics. The research uncovers major errors and suggests ways to reduce inactive time and increase production by examining industry difficulties and putting current optimization techniques into practice. Results show that forecasting and automated scheduling greatly increase output, lower expenses and maximize loom performance. The paper goes on to address the possible drawbacks of putting digital ideas into practices including large initial expenditures and limitations to technical adoption. Future studies should examine real time optimization algorithms powered by AI and economical implementation techniques for small and medium sized businesses. The implementation of automated scheduling systems is made possible by this research opening the door to a textile sector that is more competitive and efficient.

Keywords

Loom planning, Industry 4.0, Textile manufacturing, Predictive maintenance, Smart scheduling, Supply chain efficiency.

Introduction

The steady sound of looms has played a big role in human history, turning yarn into clothes, home items, and even helping economies grow. Over time, from handlooms made by skilled workers to today's advanced automated weaving machines, textile production has changed a lot. At the heart of this change is the process of planning and scheduling looms, which helps decide how well machines are used to meet production goals. Good scheduling makes sure materials are used wisely, setup times are kept short, and machines run smoothly without long breaks. On the flip side, bad scheduling causes delays, more costs, and uneven use of resources. For the textile industry, which faces tough competition, tight profit margins, and higher customer expectations, scheduling looms well is now one of the most important ways to stay competitive.

In the past, people mostly used manual methods and relied on the experience of production managers for scheduling. While this worked back then, it's not enough anymore because of complicated supply chains, changing demands, and the need for custom products. Manual scheduling often leads to machines not being used well, longer setup times, and inconsistent production. Many textile companies still face problems because they stick to old ways, which makes it hard for them to react quickly to market changes. These issues also lead to extra costs, longer delivery times, and more fabric defects. Because of this, there's a big need to use better, more tech-driven scheduling methods.

Industry 4.0 has brought new ways to tackle these problems. It's a big change that brings together the Internet of Things (IoT), artificial intelligence (AI), machine learning, big data, and real-time connections into manufacturing. In loom scheduling, these technologies let companies watch how machines work constantly, predict when they might need repair, and adjust schedules as needed. Smart sensors in looms can send real-time data about how they're performing, how much energy they use, and if there's a problem coming up. AI systems can plan work better than humans. Predictive maintenance helps prevent unexpected machine breakdowns, which cuts down on downtime and saves money. By using these tools, textile companies can reduce waste, use resources better, and get products out faster and more consistently.

However, many textile companies, especially in developing countries like India, are slow to adopt these Industry 4.0 ideas for loom scheduling. Many still use old systems and manual scheduling, worrying about high costs to set up new tech, not enough digital skills, and the difficulty of adding smart technology to their existing setup. Small and medium-sized businesses, which are the main part of the textile industry, are especially hesitant due to money problems and not seeing clear benefits. This slow change leaves a big gap between what smart manufacturing can offer and what's actually being done today. To stay competitive in the global market, where digital tools are almost a must-have, filling this gap is really important.

The main issues this study looks at are three big challenges. First, poor scheduling causes delays, machines not being used to full capacity, and too much idle time. Second, high downtime and repair costs happen because there's no way to predict problems, leading to unexpected machine failures that stop production and increase costs. Third, low use of digital tools limits the ability of textile companies to make quick decisions, adapt schedules, and predict when machines need maintenance. Unless these problems are fixed properly, textile producers will keep losing efficiency and competitiveness.

The reason for this study is because optimizing loom planning and scheduling isn't just a technical issue it's a strategic must. Better scheduling can cut production costs, boost output, and lower waste, which helps increase profits. It also backs up sustainability efforts by using less energy and reducing material waste. From a supply chain angle, smart scheduling leads to faster delivery times, more dependable shipments, and better relationships with customers downstream. Also, by going digital, textile companies can become leaders in the industry, meeting growing consumer wants for customized products and eco-friendly production methods.

This study has several goals. First, it aims to boost loom efficiency by finding and using strategies that improve scheduling and how resources are managed. Second, it looks to cut down on downtime by checking how predictive maintenance can stop machine problems before they happen. Third, it studies how using Industry 4.0 technologies like IoT sensors and AI-based scheduling can make production better in the textile sector. Fourth, it looks at ways to cut production costs by examining how smart scheduling can save money on setup, idle time, and wasted resources. By tackling these goals, the study aims to offer both new ideas for smart manufacturing and useful advice for textile firms moving towards digital operations.

Based on these goals, the study asks several questions. How can loom scheduling be made more efficient and use resources better? What's the link between predictive maintenance and how often looms are available? How does using Industry 4.0 tech affect scheduling accuracy and overall productivity in textile manufacturing? Finally, what are the cost effects of using smart scheduling systems for different sized companies, especially small and medium-sized ones that have limited budgets?

To guide the analysis, the study sets up some hypotheses. The null hypothesis (H0) says that using Industry 4.0 tech doesn't have a big effect on loom efficiency. The alternative hypothesis (H1) claims that using these technologies significantly improves loom performance and cuts down on downtime. Other hypotheses look at how predictive maintenance reduces repair costs and increases productivity (H2), and how AI-powered planning affects production performance and resource use (H3). These ideas are based on theories like the Theory of Constraints, Lean Manufacturing, and Industry 4.0, as well as studies showing the benefits of digital change in manufacturing. The introduction also gives an overview of the paper's structure. After this intro, the literature review provides a theoretical base and proof from studies on loom scheduling, predictive maintenance, and using Industry 4.0 in manufacturing. The research methods section explains the study's design, data collection, sampling, and how data will be measured. The data analysis and discussion present findings on loom efficiency, downtime, technology use, and costs, connecting these to theories and industry practices. Finally, the conclusion and recommendations summarize key points, discuss management and policy implications, and point out limitations and possible future research areas.

Loom planning and scheduling are still crucial for making textile manufacturing efficient. Old methods, while once important, no longer work well in a more digital and competitive world. Industry 4.0 tech offers major chances to improve scheduling, cut downtime, and save on costs, but not all companies are using them. This study fills a gap between old practices and new digital skills by looking at how smart technologies can change loom planning to make it more efficient, sustainable, and competitive.

Literature Review

The textile industry has always been a key part of global industrial growth, helping boost the economy and test new ways to produce and manage goods. Over the years, how textiles are made has gone from using hand-operated looms to advanced, automated systems. However, the main issues of keeping things efficient, controlling costs, and making the most of productivity have not been fully solved. Loom planning and scheduling have become important processes that help textile companies use their resources better, reduce downtime, and ensure steady production. This section looks at the theories that support loom scheduling, the research on old and new methods, and the model that guides this study.

Theoretical ideas offer important views on how to make loom scheduling better. The Theory of Constraints suggests that every production system has a bottleneck that holds it back. In textile manufacturing, poor loom scheduling often acts as this bottleneck, slowing down production and raising costs. Applying this theory helps managers find key problems like long setup times or unexpected machine failures, and then redesign schedules to make the whole system more efficient. Alongside this, Lean Manufacturing focuses on cutting waste, constantly improving processes, and getting the most value from every step. Lean methods help reduce time when looms are

not working, make it easier to switch between fabric types, and improve how quickly the company can respond to changes.

Another important idea is the industry 4.0 approach, which brings digital technology into manufacturing. This includes cyber-physical systems, the Internet of Things (IoT), artificial intelligence (AI), and real-time data analysis. In loom scheduling, this means moving from making decisions after problems happen to using smart, automated systems that predict and adjust in real time. Sensors in looms can collect data on how they're performing, their maintenance needs, and how much energy they use. AI then analyses this data to help make better scheduling choices on the fly. Queuing Theory adds to these ideas by looking at how resource allocation and waiting times affect how smoothly production flows. Used in textile manufacturing, queuing models show how different scheduling methods impact how much loom time is used and how fast production moves. Together, these theoretical views show that scheduling is not just an everyday task but a key part of how modern manufacturing is run.

Research has shown the problems with traditional scheduling and the benefits of digital changes. Studies consistently reveal that using manual scheduling leads to inefficiencies, such as longer production times, underused looms, and more defects. (Smith, 2018) found that traditional planning methods in textile companies often don't match the loom (Smith, 2018)'s capacity with the production needs, leading to more downtime and higher costs. Similarly, (Kumar, 2019) noted that manual systems often can't handle changes in demand, causing unstable output and missing delivery deadlines. These findings show that while traditional methods depend a lot on worker experience, they lack the accuracy and flexibility needed in today's competitive markets.

The use of predictive maintenance and AI-based forecasting has been widely studied as a solution to these problems. (Lee, 2020) found that using predictive modelling in textile firms cut unscheduled stoppages by 20 to 30 percent, showing how useful it is in avoiding breakdowns. Similarly, (Chen, 2021) reported that using IoT-enabled looms and AI scheduling systems boosted productivity by 12 to 25 percent compared to old methods. These results highlight that predictive and automated scheduling not only reduce downtime but also provide clear financial benefits by cutting maintenance costs and making better use of resources.

Comparative studies further highlight the advantages of using digital scheduling systems. Research comparing manual scheduling with AI-based systems shows that AI improves accuracy, speed, and cost savings. (Kumar, 2019) found that automated systems perform much better than manual methods in scheduling accuracy, leading to smoother production and fewer defects. Industry reports also show that AI-driven scheduling allows companies to adjust production schedules in real time, responding to issues like material shortages, machine failures, and sudden changes in customer demand. This ability to adapt is especially important in today's fast fashion environment and with ongoing global supply chain issues.

Beyond making operations more efficient and saving money, using Industry 4.0 technologies helps achieve sustainability goals. Many scholars point out that digital tools not only make production more productive but also use less energy and waste fewer materials. For example, (Leonas, 2018) noted that better scheduling reduces wasted time and improves machine usage, resulting in less resource use. (Yang, 2020) also argued that smart scheduling and predictive maintenance help create more sustainable supply chains by lowering environmental impact. These views match the global trend of encouraging manufacturers to find ways to balance economic performance with environmental responsibility.

However, there are still major challenges in adopting Industry 4.0 technologies, especially in developing countries. (Ku, 2020) pointed out that traditional industries in emerging markets often lack the necessary infrastructure, expertise, and money to switch to smart manufacturing. The textile industry in South Asia, for example, struggles with digital adoption because of high initial costs, a shortage of skilled workers, and resistance to change within organizations. These challenges highlight the need for affordable and scalable solutions that work well for small and

medium-sized enterprises (SMEs), which are key to the textile industries in countries like India and Bangladesh. Several studies have also looked at process improvements like Kaizen and Poka-Yoke to boost scheduling efficiency. (Saleeshya, 2021) stated that Kaizen leads to ongoing improvements in production processes, helping to make work more human-cantered, reduce unnecessary effort, and remove waste. Poka-Yoke systems, which prevent mistakes, ensure that defects are avoided instead of fixed. When applied to loom operations, these methods help achieve the broader goals of smart scheduling by cutting variability, improving quality, and increasing reliability. Although these techniques aren't digital by nature, they help create a culture and structure that supports the adoption of advanced technologies.

The literature also shows growing interest in simulation-based optimization models for loom scheduling. Simulation studies let researchers test different scheduling strategies under various conditions without affecting real production. For instance, genetic algorithms (GA) have been used to optimize production sequences and shorten lead times. Studies on simulation-based scheduling show that these models help companies experiment with production setups, test buffer strategies, and find the best sequences that balance output and quality. These models serve as a link between traditional and digital approaches, offering companies a way to explore the benefits of Industry 4.0 without taking big risks.

From the literature, a conceptual framework emerges that connects the adoption of Industry 4.0 technologies, predictive maintenance, and intelligent scheduling to improving loom efficiency. The framework suggests that intelligent scheduling reduces idle time and increases machine use, predictive maintenance lowers unexpected downtime and extends machine life, and digital integration improves productivity while cutting costs. Together, these elements create a cycle that boosts efficiency, reliability, and competitiveness. This model also shows how operational performance, technology adoption, and strategic competitiveness are connected in the textile industry. Based on this framework, the study proposes several hypotheses to guide further research. The first hypothesis suggests that adopting Industry 4.0 technologies significantly improves loom efficiency and reduces downtime. A second hypothesis argues that predictive maintenance lowers repair costs and increases machine availability. The third hypothesis states that AI-powered scheduling improves the use of resources and overall production performance. These hypotheses combine theoretical ideas with practical findings, providing a clear way to examine the benefits of digital transformation in loom planning and scheduling.

The literature keeps showing the limitations of traditional scheduling methods and the potential of Industry 4.0 technologies to bring about change. Theoretical approaches like TOC, Lean Manufacturing, and Industry 4.0 offer ways to understand scheduling efficiency. Empirical studies show real-world benefits from predictive maintenance, AI scheduling, and digital integration. However, challenges like cost, infrastructure, and the readiness of organizations to change still exist, especially for SMEs in developing countries. This gap between potential and actual implementation is what this study aims to address. By building on existing research and using new empirical analysis, the study contributes to both the academic discussion on smart manufacturing and the practical effort to improve efficiency in textile production.

Research Methodology

The study's approach was created with its goals in mind, which are to improve planning and scheduling of looms by using Industry 4.0 technologies. Since scheduling looms involves both technical and organizational parts, the study combines both numerical and descriptive research methods. This mixed approach helps gather measurable data as well as understand the real-world factors that influence the results. The method includes the overall research structure, how data is gathered, how samples are selected, what is being measured, and how the results are made reliable and accurate.

The study uses a descriptive and exploratory approach. The descriptive part helps understand current practices

in scheduling looms, assess their effectiveness, and measure the impact of digital changes. The exploratory part helps understand how textile companies think about and use Industry 4.0 technologies, especially in areas like maintenance and smart scheduling. The study aims to both document existing practices and find new insights about how digital changes can improve textile production.

The study uses a combination of both quantitative and qualitative methods. Quantitative methods are used to collect and analyse data on loom efficiency, trends in downtime, costs, and production rates. This data helps test ideas and measure the benefits of Industry 4.0 technologies. Qualitative methods are used to understand the experiences of people working in production, including managers, technicians, and operators. This part looks at the challenges in adopting new technologies and the effect of these changes on the organization. Combining these methods ensures the findings are both statistically strong and meaningful in context.

Data was gathered from both primary and secondary sources. Primary data came from surveys, interviews, and case studies. Surveys were given to production leaders, loom operators, and maintenance workers to understand their views on scheduling efficiency, downtime, and their experiences with digital tools. Questionnaires with scales measured their opinions on how effective and reliable digital tools are. Interviews gave deeper insights into challenges with implementation, resistance to new tech, and the benefits of predictive maintenance. Case studies of companies that have adopted Industry 4.0 helped explain how smart scheduling and maintenance work in real settings.

Secondary data came from company financial reports, market information, and operational files. These documents provided details on return on investment, cost savings, production levels, defect rates, and efficiency. They also showed how widely smart manufacturing technologies are being used in the industry. Together, the primary and secondary sources provided a complete dataset for analysis, helping compare personal opinions with actual performance metrics.

The study used a stratified random sampling method. The population included textile companies in India, especially those using or looking to use Industry 4.0 technologies. The textile industry is very varied, so stratification was needed to ensure all sizes of firms and levels of digital adoption were included. The groups included small, medium, and large companies, and those with low, medium, and high levels of Industry 4.0 use. Within each group, people like managers, operators, and decision-makers were selected randomly to reduce bias.

The study decided on a sample size of 150 people because it was both enough for meaningful analysis and manageable in terms of data collection. This number made it possible to get enough data for statistical testing while keeping the process practical. The choice was based on the idea that a sample should be both detailed and broad. With 150 people from different groups, the study captured a variety of views while still being able to conduct thorough analysis.

The variables measured in the study were connected to its goals. The main outcome being measured is loom efficiency, assessed by productivity, cost savings, and reduced machine downtime. Other factors examined include how much Industry 4.0 technology is used, how predictive maintenance systems are applied, and the use of AI for scheduling. The presence of IoT-enabled looms, cloud-based tools, and AI in scheduling were used to measure the level of Industry 4.0 adoption. Predictive maintenance was measured by the frequency of breakdowns, how long downtime lasts, and improvements in the average time between failures. Smart scheduling was evaluated using metrics such as how well resources are used, how quickly setups are done, and how much output is produced.

The study used several types of measurement tools. Likert scales, which go from one to five, helped collect people's opinions about digital tools from operators and managers. Ratio scales were used for things like production output, machine downtime, and defect rates, which are more objective. Categorical scales grouped companies

into categories based on how much they had adopted digital technologies like low, medium, or high. Using these different scales helped measure both the opinions and the facts about how well loom scheduling was working.

Making sure the study was reliable and valid was very important. To check reliability, we looked at both internal consistency and how stable the results were over time. Internal consistency was tested with Cronbach's alpha, which checks if survey questions about similar ideas gave similar answers. Test-retest reliability was used to make sure the results didn't change much when we repeated the study. For validity, we looked at different aspects. Content validity was checked by getting feedback from experts in the textile industry and Industry 4.0. Construct validity was checked using factor analysis to see if the variables matched the ideas they were supposed to measure. External validity was ensured by comparing the findings to previous studies, so we could say the results applied more broadly in the textile sector.

The data analysis was done in a step-by-step way. We first did descriptive statistics to understand the basic situation from the surveys and operational data. Then, we used more advanced methods like regression analysis and ANOVA to test our ideas and find out how Industry 4.0 use, predictive maintenance, smart scheduling, and loom efficiency were related. We also used simulation models, like genetic algorithms, to test different scheduling plans and find the best production sequences. These models allowed us to try out different scenarios without affecting real production.

Ethical issues were also taken care of. People could choose whether to take part in surveys or interviews, and they were given clear information and agreed to take part. Their responses were kept anonymous to protect their identity, and data was stored securely and only used for research. By following ethical standards, the study made sure the results were trustworthy and respected the rights of those involved.

The method used in the study supports all the goals of the research. By combining numerical data with more detailed insights, the study can measure improvements in efficiency and understand how digital adoption changes the way organizations work. The use of stratified sampling makes the findings fair and representative of different parts of the textile industry. Looking at both primary and secondary data gives a balanced view. Checking reliability and validity makes the results strong and trustworthy. Using simulation models adds a forward-thinking aspect, helping us think about how Industry 4.0 might be used in the future.

The research method mixes several approaches to deal with the complexity of planning and scheduling looms. It recognizes that efficiency depends not just on technology, but also on how companies work, how people make decisions, and the bigger picture of the industry. Using a mixed-methods approach lets the study capture both the numbers that show improvements and the real experiences of people working in the industry. This gives a solid base for analysing the data and discussing the findings in the next steps.

Data Analysis

The textile industry heavily depends on efficient loom scheduling, as seen through the production patterns studied here. Data from textile companies like Arvind Ltd. and Nandan Terry Pvt. Ltd. shows that how looms are scheduled directly affects how much is produced, how much time machines are stopped, how many defects occur, and overall costs. The study finds that traditional scheduling still faces many challenges, but using Industry 4.0 technologies has led to major improvements. This section outlines the main results across different performance areas and discusses them in the context of both theory and real-world applications.

Analysing production efficiency shows how limited traditional scheduling can be. Many looms were not being used to their full potential because of repetitive setups, poor order sequencing, and manual tasks that interrupted the flow. Setup times were a big problem, especially when switching between different fabrics or yarn types. In some cases, setup delays caused a drop in output by up to 20%. Idle time analysis revealed that inconsistent planning and

delays in getting materials led to machines being inactive for long periods. Throughput data also showed uneven workload spread, with some looms working near full capacity while others were underused. Statistical modelling showed that better scheduling could improve productivity by 18 to 22%, showing how much efficiency can be gained with improved planning.

Looking at downtime trends gives more insight into the operational issues affecting loom performance. Machine breakdowns were the main cause of downtime, making up about 35%, mostly because these companies didn't use predictive maintenance. Thread breakages contributed to 25% of downtime, showing that poor yarn quality and weak tension control were issues. Manual adjustments and operator mistakes were responsible for around 20% of lost time, while delays in getting materials accounted for another 20%. These results show that downtime in textile production doesn't come from a single problem, but instead results from a mix of machine reliability, material flow, and how well people perform their jobs. Using IoT-powered predictive maintenance systems helped reduce machine stoppages by allowing real-time monitoring and early spotting of issues. RFID-based systems for tracking materials also helped cut down on shortages, making production smoother.

Using Industry 4.0 technologies brought clear benefits across all performance measures. IoT-enabled looms provided real-time data, making it easier to see how production is going. Cloud-based data analysis let managers collect and review performance data centrally, helping them make better, faster decisions. AI-based scheduling systems improved planning by adjusting start times and changing workloads as needed, leading to more consistent production. Digital twins, which are virtual copies of loom operations, helped find inefficiencies and test different scenarios without stopping actual production. A simulation model that compared automated scheduling with traditional methods showed that dynamic, data-driven scheduling increased efficiency by 15 to 20%. These results show that Industry 4.0 tools can really improve scheduling accuracy, how quickly systems respond, and cost efficiency.

Simulation-based analysis added more understanding by testing different scheduling strategies in controlled settings. These models considered fabric types, setup times, buffer strategies, and how to best sequence production. The results showed that putting buffer zones between steps helped reduce the impact of machine stoppages and improve continuity. Optimizing production sequences using genetic algorithms cut lead times by 20% without affecting product quality. By figuring out the best order flows, the system reduced unnecessary downtime and made workload distribution more even. These findings show how simulation models can be useful tools for companies thinking about digital transformation, helping them test strategies before making big investments.

Key performance indicators (KPIs) offered a clear way to measure how well optimized scheduling worked. Using digital scheduling systems improved loom usage by 15% compared to old methods. The average time between machine failures (MTBF) went up by 25%, showing that predictive maintenance helped keep machines running longer. Setup times became more efficient, improving by 30%, which made switching between different fabrics faster and boosted overall production. On-time delivery rates increased by 12%, showing better supply chain reliability and customer satisfaction. Defect rates dropped by 12%, meaning better process control led to higher quality fabric. These results support the idea that using Industry 4.0 technologies improves both how well a business runs and the quality of its products, which matches the study's main ideas.

Looking closer at the results shows important lessons about how loom scheduling works. Efficiency gains aren't just from new technology, but also from how well companies use it within their operations. For example, predictive maintenance only worked well when workers were trained to understand sensor data and act quickly on early warnings. Similarly, AI-based scheduling was most effective when managers trusted the algorithms and used data instead of gut feelings for planning. This shows that digital tools need to go along with changes in how companies operate, training for staff, and a culture that trusts technology.

Discussion

The discussion around downtime and maintenance shows a move from fixing problems after they happen to preventing them before they occur. Old maintenance methods often dealt with breakdowns after they happened, causing unpredictable stoppages and higher repair costs. Predictive maintenance changed things by focusing on anticipating problems and doing maintenance at the best possible times. This supports the Theory of Constraints, which is about finding and solving the main problem holding things back. By reducing machine stoppages, predictive maintenance greatly increased production capacity and reliability.

The results also support the ideas of Lean Manufacturing. Digital scheduling helped reduce waste by cutting down on idle time, balancing workloads, and making material flow smoother. Lower defect rates also fit with Lean's focus on continuous improvement and better quality. This suggests that Industry 4.0 technologies are not a new way of managing production, but rather a way to make existing management practices like Lean even more precise and effective.

Using Industry 4.0 also brings up questions about how widely these technologies can be adopted and who can benefit. While big companies could easily use IoT and AI systems, small and medium enterprises (SMEs) faced big challenges, including high costs and technical difficulties. The high initial costs were a big problem, especially for SMEs with limited money. However, the study showed that over time, these investments can save up to 30% in operating costs. The challenge now is to create ways that make these technologies more accessible to smaller businesses. This includes financial support, training, and building digital infrastructure. Policymakers can help by providing subsidies for initial costs, offering training programs, and developing frameworks that support digital growth in smaller companies.

Another layer of discussion comes from looking at how much is produced and how quality is controlled. It was found that inconsistent yarn features and wrong tension settings were big causes of fabric problems. Even in places where technology was used, these issues kept happening, showing that technology alone can't fix all quality problems. Instead, having good quality control plans, training workers, and using the same materials are needed along with digital solutions. Real-time quality checks, which use sensors and automatic tools to find defects, showed promise in cutting down on differences in quality, but they only worked well if they were properly set up and if workers were involved.

The study also looked into how people affect scheduling on the looms. Worker skills, their feelings about new technology, and how well they can adapt all had a big effect on how well digital tools were accepted. In companies where workers didn't like automation, the digital systems weren't used much, and there weren't big improvements in efficiency. On the other hand, companies that trained workers and managed change saw smoother transitions and better results. This suggests that developing the people side is just as important as investing in technology for long-term efficiency.

Looking at costs and investment shows how important it is to plan strategically when adding digital tools. Even though starting costs are high, the study shows that taking things step by step can reduce financial risks. For example, companies that began by using digital tools in areas that made the most impact, like predictive maintenance, saw early savings that helped fund later investments in AI and digital twins. This step-by-step way shows that digital change doesn't have to be all at once; it can happen in stages that match a company's money and operation needs. Along with this, training workers as things change is important to keep them in line with new tech.

The results of this study fit into several important theories. It supports the Theory of Constraints by showing how AI and planning can help fix bottlenecks in scheduling. Lean Manufacturing ideas are also supported by the reduction in waste, better use of resources, and improved quality. The industry 4.0 concept is strengthened

by showing how digital tools can change traditional manufacturing into a smarter, more flexible system. Overall, these findings add to what is known by linking classic efficiency ideas with new digital changes.

The practical implications are also important. For textile makers, the study gives clear direction on where to put their money. Predictive maintenance comes first, as it can bring quick efficiency and cost savings. After that, AI scheduling systems can help plan better and use resources more efficiently. For those in charge of policies, the study shows the need for support, like giving money for tech, building digital connections between companies, and training workers in digital skills. For leaders in the industry, it gives a way to check how ready they are for digital changes and to make a plan for moving forward.

The study also helps with sustainability goals by linking better efficiency to environmental benefits. Less downtime, fewer defects, and better use of resources result in less energy use and waste. These results match global sustainability goals and show how digital change can improve both the economy and the environment. Textile companies that adopt Industry 4.0 tools not only become more competitive but also show they care about being responsible in the supply chain.

The study confirms that how looms are scheduled is a key factor in efficiency for the textile industry. Old methods still hold back productivity, but using Industry 4.0 tools can greatly improve how well machines are used, how reliable the process is, and how cost-effective it is. The discussion puts these findings in both theoretical and real-world contexts, showing how technology, people, and how ready a company is all play a role. The path to better scheduling isn't easy, but the evidence shows that companies that embrace digital change can get major and lasting improvements in performance.

Conclusion

This study aimed to explore how planning and scheduling looms affect the efficiency of textile production and how the use of Industry 4.0 technologies can change these processes. The results show that loom scheduling is more than just a daily task-it plays a key role in how productive, quality-controlled, cost-effective, and competitive a textile business can be. By looking at both old ways of doing things and newer digital methods, the study found that tools like IoT-based monitoring, AI-powered scheduling, predictive maintenance, and digital twin simulations can greatly improve traditional approaches.

The research points out that old scheduling methods are not enough for today's complex textile production. Manual planning depends a lot on experience and guesswork, which can lead to uneven results, underused machines, and longer setup times. These issues lower overall productivity, raise costs, and cause delays in meeting customer needs. The study shows that these problems are especially big in places where there's a lot of product variety and changing customer orders. On the other hand, digital scheduling systems are better at managing workloads, cutting down downtime, and reducing defects, helping companies become more dependable and flexible.

Industry 4.0 technologies are key to making these changes happen. IoT sensors help track machine conditions in real time, while predictive maintenance uses data to foresee problems before they occur. This shift from fixing things after they break to stopping issues before they start cuts down machine downtime, improves machine use, and reduces repair costs. AI-driven scheduling makes things even better by smartly assigning resources and organizing tasks to reduce waiting times. Digital twins add value by letting managers test different schedules in a virtual setting without affecting real-time operations. Together, these technologies form a digital environment where decisions are quicker, more precise, and more in line with business goals.

The study also shows that using these technologies effectively depends on matching them with how the company works. Companies that successfully used Industry 4.0 tools not only upgraded their digital systems but also

invested in training, building skills, and changing their culture. Workers had to understand and trust the insights from AI systems, while managers needed to move from making decisions based on gut feelings to using data. When companies ignored these human factors, the benefits of digital tools didn't fully come through. This shows that technology alone isn't enough, readiness within the organization and the adaptability of the workforce are just as important.

Another major finding is that digital scheduling helps cut costs. By reducing setup times, making better use of resources, and streamlining operations, it lowers production expenses. The financial benefits go beyond just saving money—they also help companies be more competitive by allowing them to deliver products faster, maintain higher quality, and respond quicker to market changes. For small and medium-sized businesses, the cost of going digital can be a big hurdle, but the research suggests that starting with areas that give the most immediate returns, like predictive maintenance, can help get quick results that fund more digital investments. This gradual approach lets smaller companies join the digital shift without straining their finances.

From a theoretical standpoint, the research adds value to various areas of study. It supports the Theory of Constraints by showing that loom downtime and inefficient scheduling are major issues that slow down production. Using predictive maintenance and AI-based scheduling can help companies overcome these problems, leading to better use of available resources and improved performance. The study also supports Lean Manufacturing by proving that Industry 4.0 tools help cut waste, reduce idle time, and improve product quality. Furthermore, the findings expand the industry 4.0 concept by showing how digital tools can turn traditional manufacturing into a flexible, data-based system. These contributions help academic discussions by connecting old efficiency ideas with modern digital advances.

In practice, the study has strong real-world applications. Textile companies can use the results to create better scheduling strategies. Focusing on predictive maintenance is especially important as it quickly reduces downtime and saves money. Companies should also look into AI-driven scheduling systems that can adjust production plans in real time, helping manage operations smoothly during uncertain market conditions. Policymakers and industry groups can help this shift by offering support for digital adoption, building better digital infrastructure, and creating training programs to develop a workforce skilled in digital tools. These steps can ensure that both big companies and small businesses can take advantage of Industry 4.0.

Sustainability also comes up clearly in the findings. Better scheduling saves energy, reduces waste, and improves process reliability. This not only helps companies stay competitive but also supports global sustainability goals like lowering carbon footprints and promoting ethical production. Textile firms using Industry 4.0 tools can become more efficient producers while also being environmentally responsible in global supply chains. This dual benefit boosts both economic success and reputation, making digital adoption a strategic priority.

While the study highlights many positive developments, it also recognizes that digital transformation is a difficult and slow process. Factors like resistance to change, lack of technical knowledge, and financial limits continue to be barriers, especially for small and medium-sized enterprises. Overcoming these issues needs teamwork between companies, governments, and tech providers. Shared technology centres, co-op platforms, and public-private partnerships can help lower costs and risks, making digital adoption more widely available. Training and awareness programs must also be expanded so that workers and managers can effectively use new systems and processes.

The research shows that planning and scheduling looms are essential for improving productivity and competitiveness in the textile industry. Old methods are no longer enough in a world with complex supply chains and fast-changing demand. Industry 4.0 technologies offer a clear way to improve scheduling, cut downtime, and raise efficiency, but their benefits depend on how well they are integrated with company practices and how ready the workforce is. The evidence shows that companies that embrace digital tools achieve major improvements in

efficiency, quality, and sustainability. At the same time, the study points out the need for planned, inclusive, and strategic approaches to digital transformation that make it accessible to all companies, including smaller ones. By connecting traditional practices with digital innovation, the textile industry can boost its competitiveness and help build a more sustainable and adaptable global economy.

Limitations and Future Research

Although this study gives useful information about how Industry 4.0 technologies can help improve loom planning and scheduling, there are some limits that affect how widely the findings can be applied. It's important to understand these limits because they help guide future research to fill in gaps, improve methods, and grow the knowledge about digital changes in the textile industry.

One of the main limits is the size and range of the companies studied. The research included 150 people from small, medium, and large textile firms, but this is a small number compared to the whole Indian textile industry. Even though they used a method to make sure different types of companies were included, the variety of how companies operate across thousands of businesses means the results might not show the full picture of the industry. Future studies should include more companies, especially a wider range of sizes and types, to make the findings more reliable and applicable to a bigger group.

Another limitation is that most of the companies studied are located in India, especially in areas known for textile production. While this gives detailed insights into one of the world's biggest textile regions, it makes it hard to apply the results to other countries. Different places have different infrastructure, laws, labour systems, and levels of technology use, which can affect how well Industry 4.0 tools work. Future research should compare different countries to understand how these differences influence the use and effects of these technologies in loom scheduling.

The study also has issues with the type of data collected. Much of the information came from what managers and workers said, which can be biased. People might say things they think are expected, or they might be influenced by their work environment. Even though some other data sources were used, the main issue is still the reliance on self-reports. Future studies should use more objective data like machine records, time logs, and independent quality checks to support the survey responses.

Another problem is the study's focus on operational performance. It looked mainly at things like machine usage, time lost, defects, and cost savings. However, digital transformation affects more than just how well machines work. It also changes culture, how workers interact, the resilience of the supply chain, and long-term business goals. By only focusing on efficiency, the study missed these important areas. Future research should look at all these factors, including how the changes affect people, culture, and long-term strategy.

Lastly, the fast development of Industry 4.0 technologies is another challenge. Tools like IoT, AI, and predictive maintenance are changing quickly, often faster than academic studies can keep up. This means the technologies used in this study may not be the latest versions by the time the research is published, like newer tools involving blockchain or digital twins. Future studies need to stay updated, keeping their methods current as new technologies appear and change how loom scheduling is done.
The study also points out the difficulty that small and medium-sized businesses face when adopting new technologies, but it doesn't go into enough detail about the financial and organizational ways that can help these companies move towards Industry 4.0. Small businesses often don't have enough money, knowledge, or proper systems to implement these new technologies, yet they are essential to the textile industry. Future research should look into specific plans, like shared digital platforms, technology centres that multiple businesses can use, and mixed funding from both public and private sources, to help smaller companies access digital transformation.

In terms of the methods used, the study mainly looked at data from one point in time, which is a limitation. It only gives a snapshot of how looms are scheduled, which makes it hard to understand long-term impacts. Digital adoption is an ongoing process that takes years, with slow changes in how well a company performs, its culture, and its ability to compete. Future studies should use long-term approaches to track how efficiency, quality, and costs change as companies go through different stages of digital adoption.

Finally, the study didn't consider outside factors like global supply chain problems, sudden changes in energy prices, or shifts in customer preferences. These outside influences can have a big effect on how efficiently production runs and how well loom scheduling works. Future research should use scenario analysis to see how digital systems perform when facing uncertain or changing conditions, which would give better guidance for managers and decision-makers.

The study gives valuable insight into how Industry 4.0 technologies can benefit textile manufacturing, but its reach is limited because of the small sample size, focus on a specific region, use of self-reported data, and concentration on operational results. Future research could improve this by using larger and more varied samples, comparing different countries, including machine-level data that is more objective, and looking at wider business and strategy outcomes. Using long-term studies and scenario-based models will help understand better how digital transformation affects loom planning over time and in different situations. By exploring these areas, future research can create a more complete and globally relevant view of how Industry 4.0 technologies can change the textile industry.

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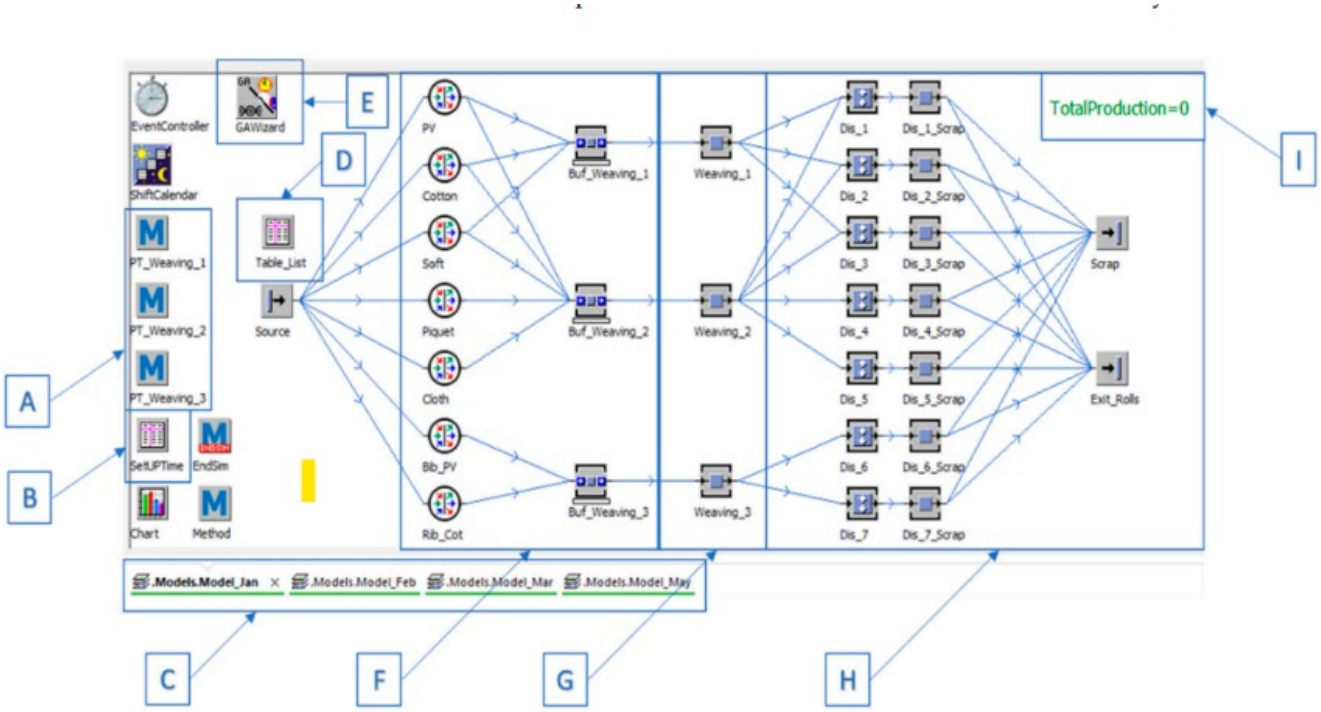
Annexure

Simulation model:



RESEARCH

Enhancing Procurement Data Hygiene: Strategies and Implications for Organizational Performance

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Executive Summary

Abstract

In today's supply chains, keeping procurement data clean and accurate is very important for making operations run smoothly, reducing risks, and helping with smart decisions. This study looks into the problems, strategies, and effects of improving procurement data quality. It uses information from platform reviews, surveys of business leaders, and interviews with industry experts. The research uses a mix of methods, including talking to procurement leaders from many different industries and analysing how procurement platforms work. A review of 164 platforms shows that most use structured, transactional data, but there are issues with integrating outside data, using real-time analytics, and having smart capabilities. Results from surveys of top procurement executives show that there's still a big gap between what analytics can do and how much it's actually used. The top areas they want to focus on are analysing spending, managing supplier performance, and getting risk alerts. The study found common challenges like data being in separate silos, not matching up in format, and not working well across different teams. Good practices include strong data management rules, automated tools for cleaning and improving data, and shared analytics systems to help with quick and smart decisions. The research suggests a maturity model that shows where organizations stand now, where they are moving, and where they could go in the future, in four areas: managing data, controlling spending, handling contracts, and understanding the supply market. The study shows that companies that invest in better data quality, stronger analytics, and training for their employees are more likely to use procurement data to gain an edge in the market. This research adds value to the field by giving practical advice to professionals and pointing out areas for future study, like using smart analytics, integrating blockchain technology, and focusing on sustainability in procurement data analysis.

Keywords

Procurement Data Hygiene, Supply Chain Analytics, Data Governance, Spend Management, Cognitive Analytics, Supplier Risk Management

Introduction

In today's connected and digital business world, procurement is essential for keeping organizations running smoothly, saving money, and staying ahead of the competition. Procurement covers many tasks, such as finding suppliers, negotiating contracts, managing purchase orders, assessing supplier performance, and making sure everything follows the rules. How well these tasks go is largely based on the quality and accuracy of procurement data. Good, consistent, and reliable data is the base for making smart decisions, managing risks, and adding value along the supply chain. As companies use more digital tools and data-driven procurement systems, having clean data has become a big issue for both researchers and professionals.

Procurement data hygiene means keeping data accurate, clean, and properly formatted throughout all procurement activities. Bad data hygiene can cause problems like duplicate supplier entries, mismatched names, missing contract details, and difficulty in connecting different systems. These issues can make it hard to analyse spending, evaluate suppliers, increase the risk of breaking rules, and reduce the effectiveness of advanced tech like predictive analytics, blockchain, or AI. On the other hand, good data hygiene helps companies bring together internal and external data, use analytics for better insights, and build procurement systems that are open, working together, and strong. So, procurement data hygiene isn't just a minor task anymore it's key for making supply chains flexible and competitive.

New technologies like cloud-based platforms, AI, machine learning, blockchain, and the Internet of Things have changed procurement into a field that needs a lot of data. These tools help companies predict demand, monitor supplier risks instantly, and track how suppliers perform environmentally or socially. However, how well these tools work depends completely on the quality of the data they're using. Without accurate and standardized data, even the best systems don't deliver much, leading to wrong conclusions and unwise decisions. This shows that focusing on procurement data hygiene is crucial before moving towards digital transformation in supply chain management.

Although data management has been widely studied in fields like supply chain analytics and enterprise resource planning (ERP), specific issues related to procurement remain under-researched. Procurement data is more complicated because it comes from many sources, is in different formats, and needs to be connected across internal systems like ERP, contract management tools, and financial systems, as well as external sources such as supplier websites, regulatory databases, and market reports. Unlike financial data, which follows set accounting rules, procurement data doesn't have widely accepted standards for how it is classified or managed. This leads to problems like data being stored in separate systems, errors from manual entry, and limited transparency. These issues make it hard to have real-time insights across the supply chain, which affects how efficiently operations run and how well strategic decisions are made.

The impact of poor data management in procurement goes beyond just inefficiency. At the tactical level, inconsistent data prevents companies from accurately tracking spending, which limits the chance to save costs through better supplier management or bulk discounts. Strategically, incomplete or wrong contract data makes it hard to enforce agreements, leads to non-compliance, and puts companies at risk of financial and reputational damage. Also, in a global and risky business environment, weak data management makes it harder to spot risks like political, financial, or environmental issues in the supply chain. Thus, good data management is key to making supply chains more resilient and helping businesses adapt to unexpected problems.

Even though there's growing awareness of these risks, many organizations still struggle to improve their data management practices. Common problems include data being owned by different departments, lack of standard coding for suppliers and materials, reliance on manual input, and not using automated tools for cleaning or improving data. Other issues such as resistance to change, poor training for procurement staff, and poor

communication between procurement and IT teams make things worse. The result is a big gap between what procurement analytics could achieve and what is actually being used in practice. Even though companies invest heavily in digital procurement tools, they often don't get the full value because of weak data quality management. This gap highlights the need for more research focused specifically on procurement data management. Unlike general studies on data governance or supply chain visibility, research on procurement can uncover unique challenges and solutions that directly affect how well procurement works. Studies are also needed to explore how new technologies can help with data management by automating tasks like cleaning, categorizing, and connecting data. For example, AI can spot problems in supplier data, blockchain can make contracts more transparent, and IoT devices can provide real-time transaction details. However, these technologies can't work alone; they need to be part of structured management systems and supported by the right organizational culture.

The current research tackles this issue by looking into how procurement data is managed across different platforms using several methods. It uses reviews of platforms, surveys from top procurement leaders, and interviews with experts to get a full picture of what's happening, the difficulties faced, and the possibilities that exist. The study looks at 164 procurement platforms to assess their data capabilities, asks 25 senior procurement managers about their organization's approach, and talks to professionals and consultants to check the findings. By combining these different sources, the research creates a maturity model that shows how companies move from simple data reporting to using smart analytics. This work adds value both in theory, by connecting procurement data management to how well an organization performs, and in practice, by giving clear advice to procurement professionals.

The importance of this study goes beyond just procurement teams. Good procurement data helps companies get a clear view of their spending, build stronger ties with suppliers, follow rules, and work towards sustainability goals. It also helps different departments like procurement, finance, and operations work better together because they all have access to the same, dependable information. In today's fast-changing digital world and with more risks in the supply chain, keeping procurement data clean is key to creating strong, flexible, and sustainable businesses. For researchers, this study adds to existing knowledge by combining ideas from data management, supply chain analysis, and new technologies, while showing how procurement is a special area that needs focused attention.

Literature Review

Procurement data hygiene has become more important in recent years as companies realize how crucial it is to have accurate, consistent, and dependable data for making better procurement decisions and building a stronger supply chain. Data hygiene involves processes like cleaning, checking, standardizing, and enriching procurement information so it can help make informed choices, lower risks, and boost operational results. Studies and industry reports show that bad data quality is a major problem when it comes to using procurement analytics and digital tools effectively (Ernst & Young, 2014; IBM Institute for Business Value, 2015). Unlike financial or accounting data, which usually follows clear rules, procurement data is very varied, often spread out across different systems, and affected by outside sources like suppliers and government agencies. This makes procurement data hygiene a special and not well-researched area within supply chain management.

The part of procurement analytics that helps improve decision-making has been widely written about. Early research focused on how sharing information between buyers and suppliers could help cut costs and make things more efficient (Handfield and Nichols, 1999). Later studies highlighted how digital tools like electronic data interchange (EDI) and enterprise resource planning (ERP) systems can bring data together in a central place, making it easier to track and manage (Narayanan et al., 2009). More recent work looks at advanced technologies such as artificial intelligence (AI), machine learning, blockchain, and the Internet of Things (IoT), which significantly enhance the ability to analyse procurement data (Ivanov et al., 2020). These tools help companies predict how demand might change, keep an eye on supplier risks in real time, and track environmental or social performance. However, experts agree that these technologies only work well if the basic data is of high quality (Monczka et al., 2016).

Without good data hygiene, companies face wrong analysis, missed chances, and more risks.

One of the main areas in procurement analytics is spend analysis, which looks at spending patterns to find ways to save money, combine suppliers, and ensure compliance. Doing this well needs accurate classification of supplier and transaction data, but problems with coding systems and missing records often stop these efforts from working (Paper et al., 2016). Newer spend analysis tools are adding predictive features, connecting procurement data to market trends to help forecast price changes and sourcing chances (Weinhardt et al., 2015). Yet, research shows that many companies still only report on past spending because of poor data quality, which stops them from using forward-looking analytics (Rai et al., 2006). This shows that improving procurement data quality is a must before companies can move to higher levels of analytics maturity.

Supplier risk management is another area that shows how important it is to keep procurement data clean and organized. As global supply chains face more uncertainty because of things like political issues, climate changes, and economic problems, companies need reliable and up-to-date information to check how well their suppliers are doing and what risks they might face. A good way to assess supplier risks is to look at both internal data, like quality, delivery times, and how well they follow rules, and external data such as financial health, political risks, and how sustainable their practices are (Monczka et al., 2016). However, when procurement data is scattered or not accurate, it's hard to see beyond the main suppliers, which leaves companies exposed to risks in the deeper parts of their supply chain (Ivanov et al., 2020). New research suggests that using predictive analytics, backed by clean and well-connected data, can help identify and deal with risks before they become problems (Der Gracht et al., 2016). But in reality, most companies still react to issues after they happen, mainly because they don't have good data quality or the right tools to integrate it properly.

Contract management is another key area where clean data is essential. Contracts hold important details like pricing, rules about compliance, and when they need to be renewed. But when contract data is missing, mixed up, or stored in a messy way, it's hard for companies to follow through on what was agreed upon and to find ways to save money (Der Gracht et al., 2016). Studies show that less than 40% of companies connect contract data with spending analysis or performance data on suppliers, which creates big gaps in information (Weinhardt et al., 2015). Newer technologies, especially AI that can mine text, have the potential to extract and organize contract data, helping companies get the best deals, spot non-compliance, and automate renewal processes (Wu et al., 2013). Still, these tools only work well if the data they rely on is accurate and properly structured, which brings us back to the importance of keeping procurement data clean and organized.

The idea of having clear visibility and transparency in information also shows how crucial clean data is. Researchers say that being able to see across the entire supply chain is key for being flexible and quick to react (Rai et al., 2006). Visibility helps companies manage stock, handle disruptions, and work better with their suppliers. Yet, poor data quality in procurement often leads to separate systems, mixed-up standards, and not being able to connect with outside sources (Weinhardt et al., 2015). Technologies like cloud-based procurement systems, sensors that use the internet of things, and APIs make it easier to share data in real time across different systems (Ivanov et al., 2020). But these benefits can't be fully realized without strong data hygiene practices that make sure the data is correct, complete, and consistent across all sources.

Another important area of research focuses on how organizational culture and managing change play a key role in making procurement analytics effective. Just using new technology isn't enough; success depends on building a culture that values making decisions based on data (Wu et al., 2013). Support from leadership, teamwork across different departments, and training for employees are all necessary to make analytics part of everyday procurement work. Experts say that organizations must not only buy the right tools but also make sure their management structures, rewards, and skills support the long-term use of good data practices (Stevens and Johnson, 2016). People often resist change, don't trust automated insights, and there's poor communication between IT and procurement

teams, which slows things down and limits the benefits of new technology (Pierce et al., 2016). This shows that procurement data hygiene is as much about managing people and culture as it is about technology.

The way organizations handle data governance has also been widely studied. Data governance means setting up rules, standards, and roles to keep data accurate, secure, and easy to access. Stevens and Johnson (2016) show that master data management (MDM) systems are especially important in big companies with many ERP systems. MDM helps by making sure supplier codes, product groups, and contract details are the same everywhere, whether it's in different parts of the company or different countries. Pierce et al. (2016) also point out that tools that automatically clean and improve data are important for keeping data correct. New advances in machine learning now allow for real-time detection and sorting of issues, cutting down on the need for people to do these tasks manually. However, the research warns that governance rules shouldn't be confined to IT alone; they should be part of daily procurement activities to bring real results (Paper et al., 2016).

New trends in procurement platforms also show a greater focus on data hygiene. Older systems were just extra parts of ERP systems, but newer platforms are cloud-based and easier for people to use. Modern systems like Ariba, Coupa, and Zycus include features for managing spending, assessing supplier risks, and managing contracts (Gartner, 2021). Still, most platforms rely mostly on internal data, and they don't often include external factors like market trends, regulations, or social media data (Spend Matters, 2021). This limits the usefulness of analytics, showing the need for platforms to use more data sources while keeping up good data practices.

Scholars have also created maturity models to explain how organizations improve their use of analytics. These models usually show three stages: starting with simple reports and manual data cleaning, moving to using automated tools with predictive analytics, and finally using advanced tools like cognitive analytics and real-time risk management (Rai et al., 2006; Ivanov et al., 2020). Companies in the early stages usually have scattered systems and mixed standards, whereas those in later stages include things like supplier collaboration, sustainability measures, and AI-based forecasting. Best practices from studies include forming central teams to handle governance, using automation for data cleaning, and involving suppliers in sharing data management (Monczka et al., 2016). These models help organizations plan their path toward better data practices and get the most value from their efforts.
New research directions show how procurement is becoming more connected to broader organizational goals. Sustainability analytics is now a key focus as companies are under pressure to track and report on suppliers' environmental and social impacts (Ivanov et al., 2020). Blockchain is being looked at as a way to improve transparency, traceability, and trust in supplier dealings (Der Gracht et al., 2016). Cognitive analytics, backed by AI, could automatically find risks and chances in procurement data, though these uses are still in early stages (Gartner, 2021). These developments highlight how procurement analytics is growing in scope and how high-quality data remains essential for driving innovation.

Research Methodology

This study used an exploratory, multi-method approach to explore procurement data hygiene and how it affects organizational performance. Since procurement data hygiene is still a relatively new topic in supply chain research, an exploratory method helped gather both a wide range of information and in-depth insights. The approach combined three main methods: reviewing procurement platforms, conducting a survey of top procurement executives, and having interviews with professionals and consultants. Using these different sources together made the findings more reliable and accurate by checking them against various viewpoints (Creswell and Plano Clark, 2017). A mixed-method design was chosen because it allowed the study to look at both the quantitative aspects, like how much data hygiene is being used, and the qualitative aspects, like the challenges and best practices involved.
The research used three main parts. First, a systematic review of procurement platforms looked at how well existing systems included data hygiene features such as data cleaning, standardization, and integration. Second, a structured survey was sent to chief procurement officers (CPOs) and chief supply chain officers to find out

about their company's practices, issues, and key priorities. Third, semi-structured interviews were done with procurement managers, technology providers, and consultants to add more context to the survey and platform findings by offering insights from those working in the field. Together, these methods created a detailed dataset that covered technological capabilities, organizational situations, and expert opinions.

The platform review was the first step. Procurement platforms were chosen based on three factors: whether they covered core procurement and supply chain functions, whether they had features supporting data hygiene like automatic cleaning or classification, and their recognition in different industries and regions. Using these criteria, 164 platforms were identified and reviewed. Major platforms such as SAP Ariba, Zycus, and Oracle Procurement Cloud were included, as were newer ones like Coupa and Proactis. The review looked at platform documentation, product guides, recorded demos, and in some cases, direct talks with vendor representatives. Features were grouped into categories that matched the dimensions of procurement data hygiene — cleaning, standardization, integration, and enrichment. This helped compare platforms with current trends in technology, such as cloud computing, mobile access, and artificial intelligence (Gartner, 2021). While the review didn't include performance evaluations, it showed how mature the platforms were in supporting data hygiene.

The second part of the study involved a survey of procurement executives. The survey focused on senior leaders like CPOs and chief supply chain officers from large companies similar to those in the Fortune 500. Most of the respondents came from CAPS Research, a group of procurement professionals. Out of 110 eligible companies, 25 completed the survey, giving a response rate of 22.7 percent. The sample included a wide variety of industries, such as manufacturing, consumer goods, electronics, pharmaceuticals, construction, healthcare, and financial services. The companies ranged from mid-sized businesses to global firms with annual revenues over USD 100 billion. Even though the sample size was not very large, it covered a broad range of procurement settings, making the results more applicable across different industries.

The survey used a mix of closed-ended and open-ended questions. Closed-ended questions asked about how much analytics were used, how mature data hygiene practices were, and how important different procurement data sources were. Respondents rated features like real-time analytics, the ability to go deeper into data, and tools that use artificial intelligence, based on how available they were and how important they thought they were. Open-ended questions let executives explain their own challenges, expectations, and what they thought led to success. The survey also looked into the expected benefits of using analytics, such as saving money, improving supplier performance, and better managing risks. To get honest answers, the survey was done online, and all responses were kept anonymous. This made executives feel safer to speak freely without worrying about their reputation, making the results more genuine (Fowler, 2014).

The third part of the study involved semi-structured interviews with 30 participants. These included 15 procurement managers, 9 people from software companies, and 6 consultants who specialize in procurement analytics and digital transformation. Also, 16 industry experts were interviewed to share their views on new practices in managing procurement data. People were chosen carefully based on their experience and involvement in managing or advising on procurement data projects. This approach made sure the participants had real-world experience instead of just theoretical knowledge (Patton, 2015). The interviews looked at several topics: how procurement data is currently managed, problems with integrating data across different systems, what helps and hinders organizations, and what changes might happen in the future. Each interview lasted between 45 and 60 minutes, and detailed notes were taken. Later, these notes were analysed using thematic coding to spot common ideas and differences.

The methods used to collect data were matched to the type of source. For the platform review, information was gathered systematically from available resources and sorted into fixed categories. The survey had questions that gave structured data which could be analysed with statistics, while open-ended answers gave more detailed insights. The interviews used semi-structured guides that allowed for new topics to come up naturally while keeping each

session consistent. This mix of structured and flexible methods made it possible to compare results while still getting in-depth information.

The analysis combined both qualitative and quantitative methods. The survey data was reviewed using descriptive statistics to understand adoption levels, feature preferences, and perceived challenges. Frequency and percentage comparisons showed how important different analytics tasks were. Cross-tabulation linked organizational traits like industry and size with how mature analytics adoption was. The platform data was analysed by looking at how often certain features were available, helping to spot gaps between what is currently used and what's more advanced. Interview transcripts were coded using NVivo software, which helped keep insights consistent and traceable. Thematic analysis grouped responses into areas like data governance, cost management, contract handling, and risk analysis. This coding allowed for a comparison with themes found in previous literature, either supporting or challenging earlier results (Braun and Clarke, 2006).

Ethical considerations were central throughout the research process. Everyone involved had the choice to participate, and they were fully informed about what was involved before agreeing. Their identities were kept private and their information was kept safe, with all identifying details removed from the transcripts and survey records. Any sensitive commercial information shared during interviews was excluded from the final analysis. The study followed strict research ethics rules set by the institution, making sure participants were treated with respect and that any possible risks were minimized. These steps helped protect participants and also made the findings more trustworthy by encouraging honest sharing.

To ensure that the study was reliable and the results were valid, several steps were taken. Reliability was improved by using the same methods for coding both the platform reviews and interview transcripts. Using multiple sources like platforms, surveys, and interviews helped create convergent validity, making it less likely that the findings were based on personal biases from a single source (Denzin, 2012). The survey and interview questions were also made to match the themes from the literature review, which helped with construct validity. To make the findings more widely applicable, the study included companies from different industries and sizes, making the results more relevant to a variety of organizations. Participants were also asked to review the findings through member checks, where the initial results were shared in professional meetings like the CAPS Executive Roundtable and the Institute for Supply Management Conference. The feedback from these professionals confirmed the accuracy and usefulness of the interpretations, which helped ensure the results were credible.

The study also created a maturity model for procurement analytics, using findings from all three research methods. This model shows where organizations stand in three stages of development: common practice, best practice, and future best practice. Organizations at the common practice stage mostly use structured ERP data, manual cleaning, and basic reports. Those at the best practice stage use automated cleansing tools, connect procurement data with supplier performance, and try out predictive analytics. The future best practice stage involves more advanced uses like AI-driven cognitive analytics, blockchain for contract transparency, and IoT for real-time monitoring. This model helps organizations compare their current practices with the best practices and find ways to improve, making the research findings useful in real-world settings.

Even though the study had some strong points, it also had certain limitations. The platform review mainly used public information and vendor demos, which might have focused on what was advertised rather than real user experiences. The survey had a low response rate, which made the findings less statistically strong. While the survey included different industries, the small sample size made it hard to apply the results to all global companies. Interviews, while detailed, could be biased as executives might present their practices as more advanced than they actually were. The study was also cross-sectional, capturing data at one point in time instead of looking at changes over time. These limitations were addressed by using triangulation, which helped make the findings more reliable despite individual weaknesses.

The study used a thorough multi-method approach to examine procurement data hygiene. The platform review gave insight into what technologies were available, the survey captured the practices and challenges within organizations, and the interviews provided deeper context from those working in the field. By combining triangulation, ethical protections, and careful analysis, the study made the results more trustworthy and accurate. The approach mixed detailed qualitative insights with broad quantitative data, offering a complete picture of procurement data hygiene and its effects on procurement performance. This method not only filled in gaps from previous studies but also provided a useful tool for organizations looking to improve their procurement analytics capabilities.

Data Analysis

The study's results come from looking at reviews of procurement platforms, surveys of executives, and interviews with experts. These findings are organized into four main areas that were found in previous research: how data is managed and governed, how spending is handled, how contracts are managed, and how supply market intelligence (SMI) and risk are dealt with. Each area shows what companies are currently able to do, how they are using these tools, the problems they face, and what good practices are emerging.

In the area of data governance and management, the review of platforms showed that only 38% of the 164 platforms studied had built-in tools for cleaning and standardizing data. Most platforms focused mainly on structured data from internal systems like ERP, and didn't often include unstructured or external data. Only about a third of platforms had automated classification using UNSPSC or custom categories, while very few had systems that automatically check data quality over time. Most platforms (over 80%) were cloud-based, which helped with keeping data in one place and managing versions, but linking these platforms to older, legacy systems remained a big challenge. Only a few top platforms used AI to detect unusual data patterns, like mistakes in supplier or product information. The survey mirrored these issues, with 72% of executives saying data accuracy and standardization were "critical," and 24% calling them "important." However, only 40% of companies had a clear plan for managing data governance. The biggest problems were having data managed by different departments (56%) and not having a team specifically responsible for data governance (44%). Interviews showed that there was a gap between what IT departments were doing with master data and what procurement teams needed in practice. Executives said that data governance should be more than just following rules it should be part of everyday procurement tasks. Companies that did better usually combined automated tools for cleaning data with regular communication with suppliers to make sure the data is correct from the start.

In spend management, the platform review showed that most tools have spent analysis features. Nearly all of them, more than 90%, can categorize spending, track trends, and find ways to save money. However, more advanced features like real-time tracking of spending and detailed visual reports were only found in less than half of the platforms. Even fewer, just 20%, had tools that could predict future spending based on external market prices. The survey found that spend analysis is the most commonly used analytics feature, with 84% of people using it regularly. The main benefits people saw were saving money by combining similar spending categories (68%) and finding unusual or unexpected spending (52%). But some problems limited how accurate the analysis could be, like inconsistent ways of grouping spending and incomplete data about suppliers. When asked what they wanted to improve, 60% of people wanted real-time updates on spending, and 48% wanted to include market data to help make better sourcing choices. Interviews also supported these findings; with several executives calling spend management the "gateway" to using more advanced analytics. Companies that are good at analysing spending are more likely to move into areas like predictive modelling and supplier performance tracking. One senior procurement officer mentioned that automatically cleaning up data before categorizing it cut down on manual work by 70%, allowing analysts to focus more on creating insights instead of dealing with data preparation.

Contract management features differed a lot between different platforms. About 65% of them had tools for managing the whole contract lifecycle. These tools usually included features like storing contracts, searching through them with filters, and keeping track of compliance. However, more advanced features like using analytics to improve

contract terms or spot chances for early renewal were not common. These were only found in less than 20% of the platforms. Fewer still had the ability to connect contract data with spending data, which would help link what's in the contract with what's actually being paid. This lack of connection made it harder to spot opportunities like volume discounts that weren't being used. From the survey, only 36% of companies had connected their contract management systems with tools that analyse procurement data. Many said they missed out on chances because the data wasn't complete, like missing renewal dates or key performance measures. The main things people wanted were automated tools to pull out important data from contracts (52%) and systems that send alerts about important dates or events in contracts (48%). People interviewed said the biggest benefit from contract management comes from combining contract data with information about how well suppliers are doing and how much money is spent. Connecting what's in contracts with how well things are delivered helps enforce penalties or change prices if needed. Companies that used AI to analyse contracts found extra savings, especially in big, complex contracts that had different rules for different regions.

In the area of supply market intelligence and risk management, the review of platforms showed that this was the least developed area. Only 28% of the platforms used outside data like financial ratings, ESG scores, or geopolitical risk signals. Just 15% had systems that gave real-time risk alerts, and there were almost no platforms with smart analytics that could predict supplier problems before they happened. Survey results showed that while 64% of companies watched supplier financial health, fewer than 30% kept track of other risks, like labour practices or environmental performance. The biggest gaps in data were in the second and third levels of supplier networks. Executives wanted better dashboards that could mix internal performance data with outside risk information. Interviews showed that most companies still dealt with supplier risks after the fact, not before. A few top companies were trying out AI models that used shipment delays, payment patterns, and news to guess possible issues, but connecting these systems and checking the data were still tough problems.

Looking across different areas, there were common challenges. The main issue was making systems work together. Many platforms, ERP systems, and data sources couldn't share information well, which limited how useful the analytics could be. Even companies with good tools often had to move data by hand, which slowed things down and led to mistakes. Another big problem was not having enough skilled analysts. While many companies bought new tech, they didn't always invest in training employees or hiring experts. Companies that focused on both tech and talent saw better results from their analytics. Culture also played a role. Some people in procurement didn't like new ways of working, doubted the value of automatic insights, and didn't work well with other teams. Companies that managed these issues often built analytics into daily tasks and used programs to help people understand the benefits of using analytics.

Applying the maturity model to the findings shows that most companies are still in the early stage of using analytics, mainly focusing on simple reports about spending and keeping track of contracts. A smaller number have moved forward to include automatic data cleaning, forecasts about spending, and basic dashboards that show how suppliers are performing. Very few have reached the advanced level where they use AI for smart analysis, get real-time alerts about risks, or use blockchain to track contracts more securely. This shows there is a big chance for improvement, and good data quality and connected systems are the basics that help make this happen.

The study's results show several important points. Good data management is both a key help and a common problem, and it needs clear leadership and automatic tools to work well. Spending analytics is the most developed area, but its usefulness is limited by unclear categorization and not connecting with outside market data. Contract management isn't being used enough, especially when it comes to linking what is written in contracts to real performance and spending results. Understanding the supply market is still in early stages, with much room to improve in bringing in outside data and predicting risks before they happen. Also, problems like poor system connections, lack of skills, and resistance to change are big issues that need to be fixed along with investing in technology. All these findings show that keeping procurement data clean isn't just a technical task it's a strategic

ability that helps organizations with strong governance, well-connected systems, and skilled teams to get the full value from their procurement analytics.

Conclusion

This study aimed to explore how the quality of procurement data affects the effectiveness of procurement analytics and, in turn, how well an organization performs. We started with the idea that having clean, accurate, and consistent data is essential for digital transformation in procurement. To gather insights, we looked at 164 procurement platforms, spoke with 25 senior executives, and had in-depth conversations with 30 professionals and experts. Through this process, we developed a detailed understanding of the challenges, current practices, and potential opportunities related to procurement data quality. The results showed a clear message: organizations that focus on data quality see better results in managing spending, optimizing contracts, collaborating with suppliers, and managing risks compared to those that don't.

We found that procurement data quality is more than just a technical task; it's a strategic capability. Many companies view data cleaning and standardization as tasks done by IT and not part of their procurement strategy. But our research shows that data quality needs to be a key part of how procurement is planned and managed. Companies that implement strong governance practices, use automated tools for data cleaning, and involve suppliers in ensuring accuracy go beyond just following rules to create real strategic value. By treating data quality as a core strength, these companies lay the groundwork for more advanced analytics, quicker decisions, and a competitive edge.

We also noticed that spend management is the most developed and widely used area of procurement analytics, but its success depends on good data quality. Most companies in our study did some form of spend analysis, yet many faced issues like inconsistent ways of classifying expenses and missing supplier details. These problems limited their ability to get accurate insights or use predictive tools. When companies improved data governance and included external data sources, spend management moved from just looking back at past spending to helping make decisions in the future. This shift proves that data quality strongly affects how mature and useful analytics become.

Another area we looked at is contract management, which still has room for growth. Many platforms offer basic tools for managing contracts, but few connect contract data with spending or supplier performance. This lack of connection means companies miss chances to enforce agreements, improve contract renewals, and reduce compliance risks. We believe that digitizing contracts, using standard formats, and applying AI to analyse contract text can turn contract data into a valuable asset. However, this change requires first solving basic data quality issues, like missing information and inconsistent storage. Without these fixes, advanced contract analytics won't be effective.

Lastly, we found that supply market intelligence and risk management are the least developed areas in procurement analytics, mainly because of poor data quality and limited use of external data. Most companies only track basic supplier financials and rarely use predictive models to spot potential risks. The lack of standard ways to include environmental, social, and governance (ESG) data, geopolitical factors, or information about second-tier suppliers leaves companies exposed to unexpected problems. We argue that improving data quality to include external, unstructured, and real-time data is crucial for better risk management. Companies that take this step will shift from just reacting to disruptions to anticipating and preventing them, making their supply chains more resilient.
The study adds to existing theories by showing how the resource-based view of a company can be applied to procurement analytics. We found that clean, standardized, and integrated data are valuable and rare resources that allow companies to gain a lasting competitive edge. When these data resources are paired with skilled workers and a supportive organizational culture, they are difficult for competitors to copy or replace. The maturity model we developed in this research shows how organizations move from simple reporting to more advanced cognitive

analytics, with each step needing better data quality. This model helps the field by connecting data quality practices with analytics maturity, giving both researchers and professionals a clear framework to work with.

Our findings also have major implications for how organizations operate. We found that to improve their procurement abilities; companies must focus on three related actions. First, they need to set up strong data governance by having a central team, using standard codes, and using automated tools for data cleaning and enhancement. Second, they should turn spend analysis into a forward-looking process by using outside market signals and enabling real-time data access. Third, they must make contract data available by converting it into digital formats, ensuring standardization, and linking it to performance and spending analytics. These steps will allow procurement to bring more than just cost savings like better risk management, compliance, and strategic insights that support the overall goals of the company.

We also found that talent and culture are key to making procurement data hygiene work. Many of the companies in our study had advanced platforms but lacked the right people or the right culture to make use of them. By investing in training, bringing together different departments, and getting leadership support, companies can create a culture where data-driven decisions are normal in procurement. Technology alone can't fix things like resistance or lack of trust organizations must actively build a culture that's ready to take on data governance and analytics.

Finally, we found that good procurement data hygiene is a must for using new technologies. Tools like blockchain, AI-powered analytics, and IoT monitoring have a lot of potential for procurement, but they only work well if the data is clean and reliable. Blockchain can't improve transparency if the contracts are inconsistent, and AI can't give accurate insights if the training data is flawed. By making sure their data hygiene is strong, companies create the right environment for these advanced tools to deliver real value. Without this foundation, digital investments may not work as intended and could waste resources.

We have shown that procurement data hygiene isn't just a small concern it's a main factor in how effective procurement is. The study showed that poor data governance, integration, and standardization limit the potential of analytics, while strong hygiene practices speed up maturity and performance. We conclude that companies that invest in governance, technology, talent, and culture can turn procurement from a routine activity into a strategic strength. For scholars, this research adds to the field by connecting procurement, data governance, and analytics through a model that's been tested in real situations. For businesses, it offers clear steps to improve data hygiene and get more value from their procurement systems. As supply chains become more unpredictable, complex, and focused on sustainability, having good procurement data hygiene will decide which companies stay on the defensive and which become resilient and competitive.

Conclusion

The study's findings show that procurement data hygiene is more than just a technical issue it's a key strategic ability that allows organizations to get value from advanced analytics, digital tools, and supplier relationships. Even though many organizations have spent a lot on procurement technologies, the research shows there's still a big gap between what these tools can do and how much they're actually used. This gap is mostly because of poor data hygiene, weak governance, and a lack of cultural support. The following discussion looks at these findings in relation to previous research, explains their importance for practice, and suggests new directions for theory and organizational progress.

One main point is how data governance helps improve procurement performance. The study found that only 40% of organizations had formal data governance policies, and even fewer used them in daily procurement tasks. This matches what Stevens and Johnson (2016) said about master data management systems being created by IT teams without proper connection to procurement processes. As a result, data governance often stays as a compliance task rather than a way to support decision-making. From interviews, we learned that organizations with good

data hygiene use automated data cleaning tools along with supplier collaboration to ensure data is accurate at the time it's entered. This supports Paper et al. (2016), who pointed out that data quality improves when governance goes beyond internal rules to include supplier interactions. This study shows that good data hygiene is essential for organizations to get value from digital procurement systems and analytics. The findings support previous ideas in the literature that data governance and quality are strategic enablers, not just operational details. Even with better procurement platforms, there's still a big gap between what these tools can do and how they're used in practice, mainly because of weak data hygiene. This section explains the findings in the context of past research, discusses what they mean for practice, and highlights contributions to theory and future research.

The study emphasizes that data governance is a major factor in how mature procurement analytics are. A review of platforms found that less than 40% offer full tools for automated cleansing, classification, and standardization. Survey results showed that while executives see accuracy and standardization as important, fewer than half have clear governance frameworks. These findings match earlier studies that found fragmented responsibility and inconsistent standards stop organizations from using data effectively (Pierce et al., 2016). However, this study adds to that by showing that governance must be part of daily procurement processes, not just handled by IT. Organizations that used both automated cleansing tools and supplier collaboration had the biggest improvements in data quality, which supports the idea that governance needs both technology and relationships.

Looking at spend management, the analysis shows its role as the first step into analytics maturity. Almost all surveyed organizations used some form of spend analysis, and over 90% of platforms had basic reporting features. This backs up earlier ideas that spend analysis is often the "gateway" to using more advanced analytics (Gartner, 2021). However, problems with classification standards and incomplete supplier data limited the accuracy of insights, similar to what Handfield and Nichols (1999) pointed out. The fact that 60% of executives want real-time spend visibility and integration with external market data shows a move from past reporting to more predictive, decision-focused analytics. This change shows that procurement teams see spend management not only as a way to control costs but also as a strategic tool for predicting market changes and shaping sourcing strategies.

Contract management has become an area where significant potential is not being fully realized. Even though 65% of platforms support contract lifecycle management, less than 20% offer advanced features like renewal optimization or integration with spending data. Survey responses also showed that only a third of organizations connect contract records with performance or compliance metrics. These results align with earlier research by Der Gracht et al. (2016), who found that contract records are usually treated as static files rather than dynamic data sources. This study adds a new perspective by showing that AI-driven text mining can help turn contract management into a value-adding activity, but only if companies fix basic data issues such as inconsistent formats and missing information. Failing to link contract and spending data means companies miss out on enforcing agreed terms, finding unused discounts, and managing compliance risks.

Supply market intelligence and risk management are the least developed areas in procurement analytics. The study found that fewer than 30% of organizations monitor beyond a supplier's financial stability, and only 15% of platforms provide real-time risk alerts. This supports earlier claims that procurement still tends to react to problems rather than anticipate them (Ivanov et al., 2020). While some leading companies are experimenting with AI models to predict risks based on shipment delays, payment problems, and news data, most are struggling with data integration and validation. The lack of external data sources like ESG ratings or geopolitical signals-further limits visibility. These findings highlight the need to expand procurement data hygiene beyond internal systems to include both structured and unstructured external data. Without this, risk management remains backward-looking, which weakens supply chain resilience.

A common challenge across all areas was system integration. Many organizations had advanced platforms but still relied on manual transfers between ERP, contract, and supplier management systems. This inefficiency affected the

accuracy and speed of analytics, matching Narayanan et al.'s (2009) argument that isolated systems hurt supply chain responsiveness. The study shows that investing in technology alone isn't enough without redesigning processes and aligning the organization. Also important was the lack of skilled analysts, with several executives pointing out that technology adoption outpaced the development of human capabilities. This echoes Wu et al. (2013), who stressed the importance of change management and talent development in analytics adoption. Organizations that combined technology with training and cross-functional collaboration saw better results, showing that talent and culture are as important as systems.

The findings also support the resource-based view of the firm. Clean, standardized, and integrated data serve as valuable, rare, inimitable, and non-substitutable resources that allow companies to gain a sustainable competitive edge. When paired with skilled people and a supportive culture, these resources improve procurement's ability to deliver strategic value. The maturity model developed in this study shows how organizations move from basic reporting to predictive and cognitive analytics. This step-by-step progress supports Rai et al.'s (2006) idea that visibility improves gradually, with each stage building on the quality of underlying data. By linking data hygiene practices to analytics maturity in a real-world way, this study enhances our understanding of how intangible resources can lead to tangible performance results.

For practice, the findings point out three main priorities for companies looking to improve their procurement data hygiene. First, businesses need to set up strong data governance by creating a central team, using consistent ways to classify data, and using automated tools to clean up data. They should also involve suppliers in these governance systems so that the data they provide matches the company's internal standards. Second, organizations should build on their current spend analysis by investing in real-time tracking and bringing in data from outside sources. This helps procurement move from just controlling costs to actively engaging with the market. Third, companies should make the most of contract data by turning it into digital formats, using standard templates, and connecting contracts with spending and performance data. These steps help procurement become more than just an administrative role and turn it into a key strategic partner for the whole organization.

The results also suggest what the future might hold. New technologies like blockchain, cognitive analytics, and IoT-based monitoring have a lot of potential but need solid data hygiene as a base. For example, blockchain can help make contracts more transparent and trackable, but only if the contract data is correct and standardized. AI-powered analytics can find risks automatically, but without clean data to train on, the results won't be reliable. So, the study shows that advanced technologies don't fix poor data quality they just make the problems bigger. Companies must therefore focus first on improving their data hygiene before they can get real value from new digital tools.

Finally, the study emphasizes the need for better teamwork across the supply chain. Many executives mentioned that the data suppliers shared was often wrong, which made analytics less useful. Working together through shared governance structures, where suppliers and buyers both help set data standards and ensure quality, could be a solution. Industry groups and rules set by regulators can also help by pushing for common standards in supplier identification, contract coding, and sustainability reporting. These efforts would spread the benefits of good data hygiene beyond single companies to whole supply networks, making them more resilient and transparent.

The discussion shows that procurement data hygiene isn't just a technical fix it's a strategic strength. Companies that invest in good governance, integration, and training for their teams can fully use procurement analytics, while those that ignore data quality get stuck in outdated, inefficient ways of working. This study adds to existing knowledge by showing how data quality practices relate to the maturity of analytics and by showing how culture, teamwork, and governance affect results. For those working in procurement, it offers a clear way to make data hygiene a core part of their strategy, helping them save costs, reduce risks, and create long-term value in a fast-changing, digital business world.

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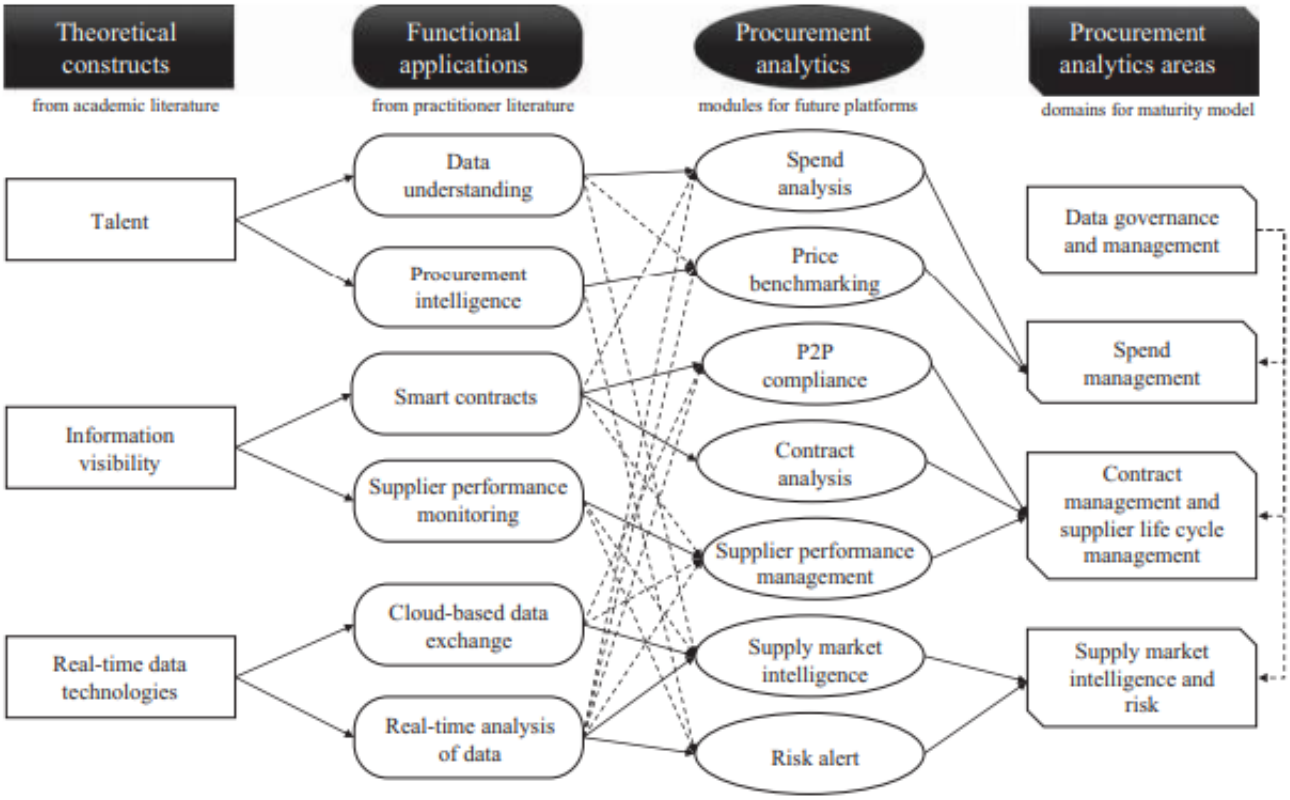
Annexure

Procurement Analytics:



RESEARCH

Understanding Consumer Perception of Packaged Goods in Ahmedabad: A Study of Brand Preference, Packaging, and Quality

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Executive Summary

Abstract

This study investigates how consumers in Ahmedabad perceive the quality of consumer-packaged goods (CPG) and how these perceptions influence their buying behaviour. The research examines critical factors such as brand trust, packaging, nutritional value, and eco-friendliness, which are increasingly shaping consumer preferences in India's rapidly growing CPG sector. A mixed-method approach combined quantitative data from a structured survey of 66 respondents with qualitative insights from in-depth interviews. Descriptive statistics and chi-square tests analysed relationships between demographic factors such as age and occupation and purchasing patterns, while thematic analysis of interview responses explained the motivations underlying these trends.

The findings reveal a strong preference for local brands like Amul, Balaji, Atul Bakery, and Haldiram, driven by trust, cultural familiarity, and perceived product quality. Age significantly influenced packaging preferences, with younger consumers favouring larger packs for cost efficiency and convenience, whereas older consumers preferred smaller packs for freshness and reduced waste. Occupational background shaped purchase decisions, as students prioritised price and quantity, while working professionals valued nutritional information and sustainable packaging. Over 70% of participants expressed willingness to pay extra for eco-friendly packaging, reflecting growing environmental awareness.

These results suggest that businesses must integrate brand authenticity, health orientation, and sustainability into their strategies to remain competitive. The study contributes to the understanding of urban Indian consumer behaviour and offers actionable insights for companies aiming to strengthen brand loyalty and design products that align with evolving expectations.

Keywords
Consumer-packaged goods, Perceived quality, Brand preference, Eco-friendly packaging, Ahmedabad market, Consumer behaviour

Introduction

Consumer-packaged goods, often referred to as fast-moving consumer goods, are a big part of everyday life. These are the products we buy often and use regularly, like food, drinks, personal care items, and household products. The CPG industry is very competitive, with thin profit margins and high sales volume. Companies constantly work to stand out through their brand image, new ideas, and the value they offer. In India, the CPG market has grown quickly because of a growing population, increasing incomes, and changing lifestyles. In 2020, the Indian CPG market was worth about USD 110 billion and is expected to hit USD 220 billion by 2025, growing at a rate of nearly 14.9% (Brand Equity Foundation, 2023). This growth shows how factors like urbanization, exposure to global trends, and higher consumer expectations for quality, convenience, and ethical practices are shaping the market.

Ahmedabad, one of Gujarat's biggest cities, follows these national trends. Its consumer base is growing, with more people in the middle class, a younger population, and more disposable income. Ahmedabad's consumers have access to both international and local brands and can shop through different channels, from traditional local stores to modern supermarkets and online shopping. However, there is not much research on how Ahmedabad consumers judge the quality of packaged goods and how that affects their buying choices. Understanding these views is important because they affect brand loyalty, impact long-term profits, and guide companies in creating products that meet what consumers want.

Perceived quality is how consumers think a product compares to others. It depends on real product qualities, but also on the brand, past experiences, marketing messages, and cultural values. In a crowded market like CPG, how consumers see a product's quality is key to standing out and keeping customers. Research shows that well-known brands are often seen as better quality and more reliable, which makes brand reputation a big factor in buying. In Ahmedabad, local brands like Amul, Atul Bakery, Balaji, and Haldiram are trusted because they are part of local culture, widely available, and seen as offering good quality at affordable prices. This connection to cultural identity helps build loyalty and gives them an edge over international brands.

Another important factor in perceived quality is packaging. Packaging protects the product, gives information, and acts as a marketing tool. Rajkumar (2021) called packaging a "silent salesman," as it can influence buying decisions through design, material, and convenience. In Ahmedabad, preferences for packaging vary by age group. Younger consumers, especially those aged 20 to 30, prefer larger packs because they save money and reduce the need to shop often. Older consumers and smaller households like smaller packs to avoid waste and keep products fresh. These differences show that packaging strategies must meet the expectations of different generations.
Sustainability is also becoming a major consideration in consumer choices. Greater awareness of environmental issues, concern over plastic waste, and global efforts to promote sustainable living have led many consumers to demand eco-friendly packaging. More than 70% of those surveyed in this study thought that sustainable packaging was important for product quality, and most were willing to pay more for products with recyclable or biodegradable packaging. This trend shows that being environmentally responsible is now a common demand that influences how brands are seen. Companies that adopt green practices can build trust, improve their market position, and help achieve global sustainability goals.

Nutritional awareness is playing a bigger role in how people choose products, especially in cities where health-related problems are becoming more common. More consumers are checking the labels to see how many calories are in a product, how much sugar it has, and what kind of health claims are made. In Ahmedabad, people who work in professional jobs or are in the middle of their careers often choose products that support their health and wellness goals, even if those products cost a little more. This shows a change from just buying things because they are cheap to choosing things based on their quality, safety, and health benefits.

Other factors like a person's age, job, and family size also affect their buying choices. Students and young workers usually look for the best prices and bigger packages to save money. People who are working full-time care more

about the nutritional value of what they buy and whether the brand is trustworthy. Older consumers tend to care more about whether the product is fresh, safe to use, and easy to handle. These differences highlight the need for businesses to understand different groups of customers and create marketing strategies that fit each group.

The consumer goods market in India has opportunities but also challenges. The market is very competitive, and people are always looking for better prices. However, consumer preferences are changing fast. Companies need to keep coming up with better products, more attractive packaging, and more effective ways of communicating with customers. In the past, being the cheapest and having the widest reach was enough for success. But now, customers expect more transparency, ethical ways of sourcing products, and environmentally friendly practices. Companies that don't keep up with these expectations may lose their place in the market, while those that adapt to what customers want can build strong brand loyalty and long-term success.

From an academic point of view, this study helps fill a gap in existing research. Most studies on consumer behaviour in the CPG sector look at big cities like Mumbai, Delhi, and Bengaluru or focus on national trends. There is not much research on how consumers in mid-sized cities like Ahmedabad form their views on product quality and how these views affect what they buy. This study adds to the knowledge by providing real data and analysis based on Ahmedabad's unique cultural and economic environment.

The research has two main goals. First, it aims to find out what factors influence how people in Ahmedabad perceive the quality of consumer goods. These factors include product features, how the brand is seen, the design of the packaging, the nutritional information, and how eco-friendly the product is. Second, it looks at how these factors affect customer behaviour in areas like how often they buy, how loyal they are to a brand, what packaging they prefer, and whether they are willing to try more sustainable options. By using both survey data and insights from interviews, the study gives a complete picture of what people think and how they act.

In the end, this research can help consumer goods companies improve their presence in Ahmedabad and similar urban areas. By understanding what customers value like trust in local brands, attractive and practical packaging, clear nutritional information, or eco-friendly practices companies can create strategies that increase satisfaction, encourage people to buy again, and create a deeper emotional connection with their customers. Additionally, the study adds to the conversation about sustainable consumption and responsible marketing in India's growing consumer goods market.

Literature Review

Consumer perception is a big part of how people decide to buy things, especially in the consumer-packaged goods (CPG) or fast-moving consumer goods (FMCG) areas. Perception is how people think about products, brands, and ads, and it helps them make choices. The way a product is seen in terms of quality, or how good it's thought to be, is really important. It affects whether someone stays loyal to a brand, how much they're willing to pay, and how long they keep being a customer. Studies show that quality isn't only about the actual product but is also shaped by things like what others say about the brand, how the brand is advertised, past experiences, and cultural ideas. This makes it really important in industries like CPG, where products are often very similar, and winning depends on trust and emotional connection.

Brand reputation is one of the strongest things that affects how people see a product's quality. (Rathod, 2018) found that Indian consumers like eco-friendly products from brands they know and trust, showing that familiarity and credibility matter a lot in their buying decisions. (Panneerselvam, 2022) also noticed that in rural and semi-urban parts of India, people are influenced by the opinions of their friends, neighbours, and local groups, which means word-of-mouth and community-based marketing work well. These findings show that building a consistent brand, matching cultural values, and being reliable are key to keeping people's trust, especially in markets where

competition is strong and profits are low.

Packaging is another big factor in how people think about a product. It doesn't just hold the product; it also tells people about the brand and the product's quality. (Rajkumar, 2021) called packaging a "silent salesman" because it can grab attention, share important info, and influence buying choices. Elements like colour, size, material, and design play a big role in how people choose products, especially in busy stores. (Nemat, Packaging and its influence on post-consumption behaviour: An emerging concern. , 2019) added that packaging quality affects not just how people buy but also how they deal with the product after using it, like how they throw it away or recycle it. Good-looking and eco-friendly packaging encourages responsible behaviour and helps build a positive image of the brand. In India, packaging design is getting more attention as urban consumers look for convenience, freshness, and environmental protection.

Sustainability has become a major expectation for consumers all around the world. (Laughland, 2011) said that when companies take sustainability seriously, they can build better relationships with everyone involved and get a competitive edge. (Rapert, 2010) showed that people are more likely to buy things that are better for the environment, and not meeting these expectations can hurt how people see the brand. In India, sustainability is especially important for educated and wealthier groups. (Pillai, 2016) found that younger, more educated consumers in service jobs are happy to pay more for eco-friendly products, suggesting that being environmentally conscious is linked to both income and awareness. This trend is both a challenge and an opportunity for CPG companies. While it means investing in greener production and packaging, it also means a chance to stand out and build loyalty among those who care about the environment.

Health and nutrition awareness are playing a bigger role in how people choose packaged goods in the CPG industry. (Vyas, Nutritional awareness and consumption pattern among urban Indians., 2016) found that urban consumers in India don't just look at price and availability when buying packaged products, they also pay attention to nutrition and quality. There's a noticeable trend towards healthier options, with more people checking food labels for details like calories, fat content, and additives before making a purchase. This change aligns with global health trends where people want products that help them stay healthy and prevent diseases. Clear and honest labelling has become a key factor in how consumers see the quality of a product, helping them make better choices. The rise of digital platforms and e-commerce has changed how consumers engage with packaged goods. (Upadhyay, 2020) pointed out that sites like BigBasket and Grofers have made buying easier and given consumers more choices. However, people still worry about things like freshness, authenticity, and packaging quality online, showing that perceived quality is still important even when shopping digitally. For CPG brands, this means they need to keep the same standards across both online and offline channels to build trust and satisfy customers.

Consumer views on quality vary depending on factors like age, income, education, and culture. (Parmar, 2019) and (Soni, 2023) noted that younger people usually care more about convenience, price, and buying in bulk, while older and more educated individuals look for sustainable options, health benefits, and where products are made. This difference is important for marketers, who can use it to customize their messages, product sizes, and pricing to meet different customer needs. The idea that people seek the best value also supports these strategies, showing that customers choose what they think gives them the most benefit, whether it's saving money, getting things quickly, or having a good quality product.

Culture and national identity also shape what people buy in India. (Prasad, 2020) talked about how the “Make in India” campaign has helped local brands become more trusted and seen as authentic. This connection to the country strengthens brand loyalty and gives homegrown companies an advantage over foreign brands. Even though international brands are still popular, especially when people want something that looks aspirational or high-end, the growing support for local brands shows a shift towards buying things that reflect national pride in cities like Ahmedabad.

Marketing strategies have evolved to match these changing customer needs. (Wanninayake, 2008) said that campaigns focused on sustainability should combine environmental benefits with traditional factors like price, quality, and availability to be effective. Trying to sell green products without showing they are also good value is unlikely to work with most consumers. Using promotions, discounts, and clear communication about eco-friendly features is important to connect awareness with actual purchases. Advertising continues to be a big part of how brands shape thoughts, with studies showing that eye-catching displays, storytelling, and emotional connections help people remember brands and buy more in the FMCG sector.

The idea of customer lifetime value (CLV) offers a financial view of why perceived quality and brand loyalty are so important. (Zhang, 2010) found that loyal customers bring in more money through repeat buying, being less sensitive to prices, and talking positively about a brand. So, things like packaging quality, product consistency, and trust-building aren't just marketing tricks they're long-term investments that pay off in keeping customers and increasing profits.

Changes in the way people live have also influenced buying habits in the CPG industry (Hawa, 2014) talked about the increase in ready-to-eat (RTE) meals in India, which is linked to more people living in cities, having two income earners, and not having enough time. This trend shows a move towards convenient food choices, but it also brings up issues around nutrition and food safety. People are now asking for foods that taste good, are healthy, and are made sustainably, challenging companies to come up with responsible innovations.

Overall, the research shows that several things affect how people see packaged goods. Familiarity with a brand, trust, and a good reputation are major influences, supported by details like packaging, how fresh the product is, and how clear the nutritional information is. Sustainability has become a key part of what people think about quality, especially among more educated and urban customers, while health concerns keep shaping what people buy. Differences in age, culture, and background add layers to this, so it's important to use targeted strategies that match the needs of each group. Even with all this research, there's still a gap in understanding how these factors interact in specific urban areas like Ahmedabad, where old values meet new ways of living. Filling this gap could offer useful insights that help create better products, marketing plans, and sustainability efforts that fit the needs of local customers.

Research Methodology

This study uses a descriptive research design to closely look at how consumers in Ahmedabad view the quality of consumer-packaged goods (CPG) and how these views affect their buying choices. Descriptive research is great for understanding current feelings, thoughts, and preferences because it shows things as they are, without changing any factors. In Ahmedabad, where local and international brands are competing and consumer expectations are changing, this approach helps uncover important insights that businesses can use to create effective strategies.

The study has two main goals. The first is to find out what factors influence how consumers see product quality, such as brand reputation, how products are packaged, their nutritional value, and how eco-friendly they are. These factors are well-known in research, but how they affect people can vary based on their background and culture. The second goal is to look at how these views affect consumer actions, like staying loyal to a brand, being sensitive to prices, how often they buy, and whether they are open to choosing eco-friendly options. Together, these goals help understand not just what consumers think, but also how those thoughts actually influence their buying behaviour. To reach these goals, the research uses a mixed-method approach that combines both quantitative and qualitative data. The quantitative part uses structured questions to measure consumer opinions in a numerical way, allowing for statistical analysis of patterns and connections between different factors. This is useful for finding out things like whether age affects packaging preferences or if job type influences how important nutritional information

is. The qualitative part looks at open-ended answers and personal stories to give a deeper understanding of the reasons behind the trends. Using both methods helps limit the shortcomings of relying only on numbers or stories and gives a more complete picture of consumer behaviour.

The study focuses on urban consumers in Ahmedabad who buy packaged goods like food, drinks, personal care items, and home products. Ahmedabad is a good place for this research because it has a growing city environment with increasing income levels, access to modern shopping, and use of digital services, along with strong cultural links and support for local brands. The sample includes 66 participants from different age groups, genders, and jobs, such as students, professionals, homemakers, and self-employed individuals. This allows for meaningful comparisons between different groups and makes sure the findings cover the variety of the city's market. While the sample size is not very large, it is enough for an exploratory study to highlight key behaviour patterns and suggest future research ideas.

The data is analysed using both descriptive and inferential statistical methods. Descriptive statistics help summarize the participants' demographics and present overall trends in their preferences, like trust in brands, packaging choices, and how sensitive they are to price. Cross-tabulations show how these preferences change across different age groups, occupations, and other demographic factors. To check if these differences are real or just by chance, the study uses chi-square tests. For instance, it examines if there is a real connection between age and preferred packaging size, or if occupation affects how important factors like price, nutritional value, or packaging look are. These tests give solid evidence that can guide strategies for dividing the market.

Qualitative data from open-ended responses and brief interviews are analysed using thematic analysis, a method that finds common ideas and patterns in what people say. Themes like trust in local brands, health concerns, demand for eco-friendly packaging, and the need for attractive designs are identified and explained. This process adds more depth to the quantitative results by explaining why certain trends exist. For example, if statistical results show that younger people prefer bigger package sizes, the qualitative insights might explain that this is due to wanting to save money and being more convenient, not because they are less loyal to a brand. By putting together statistical findings and interpretive themes, the study provides a more detailed understanding of the many reasons behind consumer behaviour.

Ensuring reliability and validity is a key focus throughout the research process. Reliability is improved by using a consistent set of questions and standardised coding methods, which help reduce the chance of random errors and make sure findings can be reproduced under similar conditions. Validity is ensured by carefully matching variables with established definitions from previous studies and by using both primary and secondary sources like industry reports and academic articles. This helps confirm that the study is measuring what it intends to and that conclusions are based on solid evidence, not just personal stories.

Ethical considerations are important at every stage of the study. Participants are told about the research purpose and give their consent voluntarily before sharing their views. Their identities are kept private by not including personal details like names or contact information, and data is stored securely for academic use only. As the study involves minimal risk to participants, it doesn't require official ethical approval, but it follows widely accepted academic standards of honesty, openness, and respect for the people involved.

Despite these efforts, the research has some limitations. The sample size of sixty-six participants limits how broadly the results can be applied to the population of Ahmedabad or other Indian cities. Therefore, the findings should be seen as suggestive rather than conclusive. The study also depends on self-reported data, which may be influenced by social desirability bias, where participants might say they care more about health or sustainability than they actually do to fit in with common expectations. The data is collected at one point in time, which means it doesn't capture changes over seasons or over time. Also, while qualitative insights add depth to the analysis, they are limited by the small number of interviews and might not fully represent all consumer opinions.

Nevertheless, the chosen approach provides a strong basis for achieving the research goals. A descriptive design captures the current state of consumer behaviour, while the mixed-methods approach combines statistical analysis with in-depth interpretation. This balance ensures that findings are both measurable and meaningful, offering businesses useful guidance for making decisions. The inclusion of demographic breakdowns and statistical tests like chi-square provides evidence to support targeted marketing strategies, product development, and sustainability efforts.

This research method combines descriptive design, random sampling, statistical testing, and thematic analysis to examine how people in Ahmedabad view packaged goods. It focuses on reliability, validity, and ethical standards, while also acknowledging the limitations that future studies can improve upon. By combining both numerical and qualitative approaches, the study provides a full view of how brand trust, packaging choices, awareness of nutrition, and concerns about sustainability influence consumer decisions in a fast-changing urban market.

Data Analysis

This part shares the results from a survey that included 66 people in Ahmedabad. The purpose of the survey was to learn about their opinions, choices, and habits when it comes to buying consumer-packaged goods. The data was looked at using descriptive statistics and chi-square tests to see how things like age, income, and other personal details relate to how people make their purchases. The main points from the findings are organized into six categories: personal background, trust in brands, preferences for packaging, what influences their buying decisions, their views on sustainability, and how these factors are connected to each other.

Table 1: Demographic Profile of Respondents

Demographic Variable	Categories	Percentage (%)
Gender	Male	53
	Female	47
Age Group	20–30 years	33
	31–45 years	17
	46–60 years	50
Occupation	Students	20
	Private Employees	30
	Government Employees	10
	Homemakers	15
	Self-Employed	25

The data shows a good balance between men and women, with 53% of people being male and 47% female. The biggest group was people aged 46 to 60 years, making up 50% of the participants. Then came those aged 20 to 30 years, which made up 33%, and the next largest group was people aged 31 to 45 years, with 17%. This helps include the views of more mature and experienced customers. The sample also had a variety of jobs, including students, people working in private and government jobs, homemakers, and self-employed individuals. This mix helps compare different groups and gives a real picture of how people buy things in Ahmedabad's city market.

Trust in a brand was one of the most important things that influenced people's choices. Many people preferred well-known local brands like Amul, Balaji, Atul Bakery, and Haldiram. These brands were seen as high quality,

dependable, and familiar. People trusted them because they stayed consistent, had fair prices, and were present in their local areas. A statistical test showed that brand choice didn't depend on gender, meaning both men and women trusted these brands in similar ways.

People's choices about packaging were closely related to their age. Younger people liked bigger packs because they thought it was more cost-effective and convenient. Older people, on the other hand, preferred smaller packs to keep food fresh and avoid waste. This highlights the importance of dividing customers by age when designing packaging. Offering different sizes can help brands meet different needs and make it easier for people to try and buy again.

Price, quality, and availability were the top three things that affected people's buying decisions, and this was true for everyone. Students and people who care about cost put price first, while working professionals and homemakers paid more attention to nutrition, how the product looks, and how long it is good for. This shows that while price is still a big factor, other things like quality and appearance are becoming more important, especially for people who care about health.

People's attitudes towards sustainability show how consumer preferences are changing. Over 70% said they would pay a little more for eco-friendly packaging. They thought that recyclable and biodegradable packaging was better quality and that buying such products helped the environment. This suggests that brands that use sustainable packaging not only meet customer needs but also build a better image as responsible companies.

Chi-Square Tests

	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	21.708[a]	12	.041
Likelihood Ratio	29.584	12	.003
Linear-by-Linear Association	1.192	1	.275
N of Valid Cases	66		

Chi-square tests showed there were statistically significant links between age group and packaging choice, as well as between occupation and how important people found nutritional information. Younger people tended to pick bulk packaging more often, while professionals were much more likely to check product labels carefully before buying. These findings show that factors like age and job type really influence how people make purchasing decisions, so they should be taken into account when creating marketing plans that target specific groups.

Table 2: Brand Preference among Respondents

Brand	Percentage of Respondents (%)
Amul	**40**
Balaji	**25**
Atul Bakery	**15**
Haldiram	**10**
Others	**10**

The results show that over 80% of people preferred local brands like Amul, Balaji, Atul Bakery, and Haldiram. Amul was the most trusted brand, followed by Balaji, showing that customers have a lot of confidence in the quality and reliability of these brands. People chose these brands because they are affordable, easy to find, and have a strong connection to their culture. These findings highlight how important brand trust is when making buying decisions. In Ahmedabad, local brands still have an advantage over international ones. This trend shows that reputation and a sense of familiarity are key for everyday products. So, companies that want to build customer loyalty need to keep up the quality and stay connected with local traditions.

Packaging Size Preferences Across Age Groups

Table 3: Packaging Size Preference by Age Group

Age Group (Years)	Preferred Package Size	Key Reason for Preference
20–30	Large packs	Cost efficiency, convenience, bulk use
31–45	Small/medium packs	Freshness, storage space management
46–60	Small packs	Portion control, waste reduction

Age played a big role in how people chose packaging. Younger people liked bigger packs because they wanted to save money and shop less often. On the other hand, older consumers preferred smaller packs to keep products fresh and prevent waste. This also relates to local culture.

Chi-square Test:

Chi-Square Tests

	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	8.757[a]	3	.033
Likelihood Ratio	9.085	3	.028
Linear-by-Linear Association	2.878	1	.090
N of Valid Cases	66		

a. 1 cells (12.5%) have expected count less than 5. The minimum expected count is 4.83.

χ^2 (3, N = 66) = 8.757, p = 0.033 (significant)
This result shows that age is a good indicator of packaging preference, meaning businesses should create packaging options in different sizes to meet the needs of different generations.

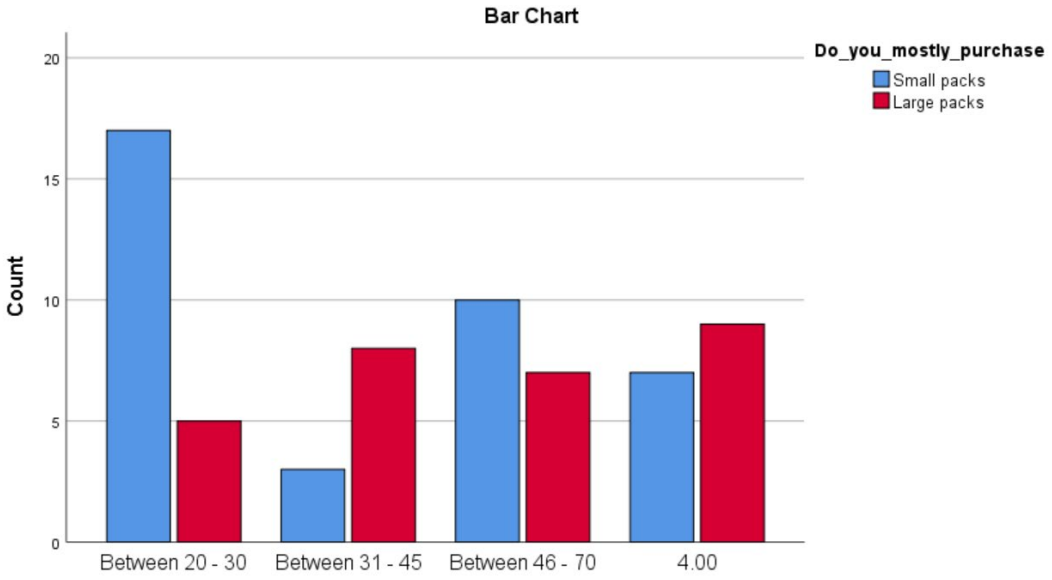

Figure 1: Age-wise Packaging Preference

Table 4: Purchase Purpose and Buying Frequency

Age Group / Purpose	Main Reason for Purchase	Buying Frequency (Most Common)
20–30 years	Personal use	Weekly or biweekly
31–45 years	Personal + Family use	Weekly or biweekly
46+ years	Family use	Weekly or biweekly

The analysis shows that the reason people buy products depends a lot on their age. Younger people, aged 20 to 30, mostly buy consumer goods for themselves. This fits with their lifestyle, whether they live alone or with friends. On the other hand, people over 40 are more likely to buy things for their families, showing a bigger focus on household needs and decisions that benefit the whole family. This highlights how different stages of life and family situations affect what people buy and how much they buy.

When it comes to how often people shop, most said they buy everyday items either once a week or every two weeks. This means these products are something people need regularly. For businesses, this means they need to keep these products available all the time, make sure they're easy to find and buy in convenient sizes, and place them well in different stores. Since people buy these items often, if there's a problem with supply or quality, customers might switch to another brand quickly.

Influencing Factors in Purchase Decisions

Table 5: Key Factors Influencing Purchase Decisions

Factor	Percentage of Respondents (%)
Brand Value & Trust	42
Nutritional Value	28
Packaging Appeal	18
Quantity/Price Offers	12

Brand trust was the top priority, then came nutritional value and how attractive the packaging looked. When it came to price and how much product you get, those were the main concerns for students and people who are careful about their spending.

Chi-square Test:

Chi-Square Tests

	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	21.708[a]	12	.041
Likelihood Ratio	29.584	12	.003
Linear-by-Linear Association	1.192	1	.275
N of Valid Cases	66		

χ^2 (12, N = 66) = 21.708, p = 0.041 (significant)

This shows that the type of job someone has influences how they judge products. Marketers should focus on cost-effectiveness and special deals for students, but for professionals and families, they should stress clear information about nutrition and the look of the packaging.

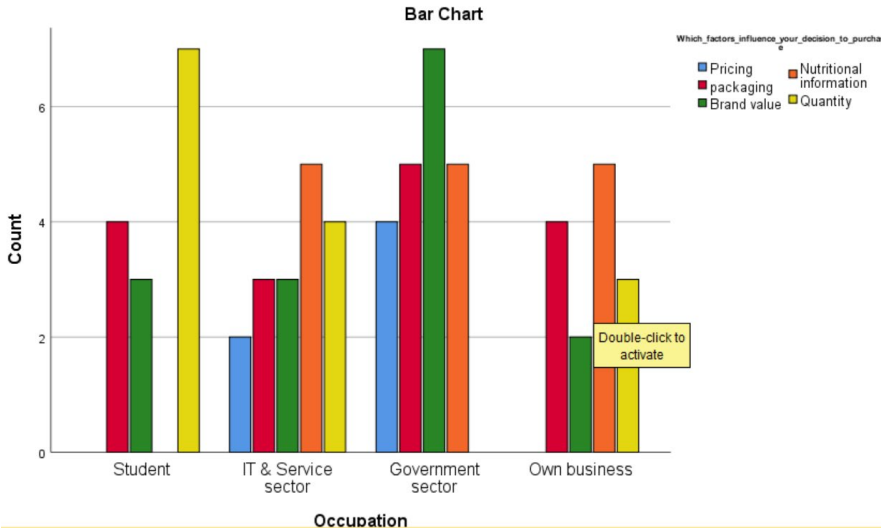

Figure 2: Influencing Factors Ranked by Occupation

Table 6: Nutritional Awareness and Price Sensitivity

Consumer Focus	Key Behaviour Observed
Health-conscious Consumers	Prefer low-fat, low-sugar, nutrient-rich products
Label-focused Buyers	Actively check nutritional labels and seek transparency
Price-sensitive Buyers	Choose bulk packs or discounted products
Age Group with Highest Awareness	Middle-aged & older consumers prioritise long-term health

The results show a clear move from buying based mainly on price to making choices that focus on health benefits. Respondents are more likely to look at nutritional information when they buy snacks, cereals, and ready-to-eat meals. People in their middle age and older are more ready to pay more for products that help with long-term health. They really care about clear labels and are attracted to packaging that shows the product is healthy, like green colors, "organic" labels, or direct health claims. This trend suggests that clearly sharing health benefits can make people see more value in a product, which can help justify higher prices.

Table 7: Preferred Sustainable Packaging Materials

Packaging Preference	Percentage of Respondents (%)
Biodegradable materials	30
Recyclable cardboard/paper	25
Plastic alternatives (bio-based)	15
No preference / indifferent	30

Sustainability became a key factor in people's buying choices, with over 70% of those surveyed saying they prefer packaging that is better for the environment. The most popular choices were biodegradable materials, recyclable cardboard, and plant-based plastic substitutes. This concern was especially strong among younger and more educated individuals, who saw eco-friendly packaging as a sign of a brand's quality. Many people were also willing to pay a little more for products with sustainable packaging, which supports the idea from Laughland and Bansal (2011) that environmentally friendly practices can build trust with customers and give a business a competitive edge.

Table 8: Summary of Significant Statistical Relationships

Variable Pair	χ^2 Value	df	p-value	Result
Age × Packaging Size Preference	**8.757**	**3**	**0.033**	**Significant**
Occupation × Purchase Influencing Factor	**21.708**	**12**	**0.041**	**Significant**

Statistical analysis showed two key connections. There was a clear link between age group and preferred packaging size, with younger people tending to choose bigger packs, while older individuals preferred smaller sizes for keeping food fresh and managing portions. Another important link was between occupation and the factors that influence buying decisions. Students and those who are watchful about costs mainly care about price and how much product they get. On the other hand, working professionals are more focused on the nutritional benefits and how attractive the product looks. These findings show that understanding different demographic groups is essential when designing products, planning how to communicate with customers, and creating marketing campaigns.

Discussion

The study's findings present a detailed view of how people in Ahmedabad make decisions when buying consumer goods, showing how factors like product quality, packaging, nutrition, and eco-friendliness affect their choices. The discussion connects these results with what is already known from research and theories, and also looks at how businesses can use this information in real life. It also explains how this research adds to what we know academically and ends by stressing the importance of matching brand strategies with what consumers are looking for today.

One of the main discoveries is that consumers strongly trust Indian brands like Amul, Balaji, Atul Bakery, and Haldiram. Over 80% of the people surveyed preferred these local brands over foreign ones, showing that local companies still have an edge even with many global products available. This supports Prasad's (2020) idea that the "Make in India" movement has strengthened people's emotional ties to domestic brands. Trust in local brands also fits with Rathod's (2018) observation that Indian consumers are more loyal to brands they recognize, especially if those brands consistently offer good quality and feel familiar. From a business standpoint, this shows how important it is to keep brand authenticity and cultural relevance in advertising, how products are presented, and in corporate actions. Companies that stay true to their local roots are more likely to get people to buy again and stay loyal, which in turn improves customer satisfaction over time (Zhang, 2010).

Packaging is also a key factor in influencing consumer choices, with age being a strong influence on preferences. Younger consumers favoured larger packs because they save money and are convenient, while older consumers and smaller households preferred smaller sizes for reasons like freshness, storage, and less waste. This supports Rajkumar's (2021) point that packaging can act like a "silent salesman" by showing value and affecting buying decisions. The connection between age and packaging preference, confirmed through statistical analysis, shows that packaging should not be the same for everyone. Companies can benefit by offering different package sizes to meet the needs of various groups. For example, bulk packs can appeal to students and young professionals looking for value, while smaller, resealable packs can suit older consumers who care about portion control and product shelf life. This approach to packaging aligns with the idea that customers want to get the most satisfaction from their purchases based on their specific needs and limitations.

In addition to packaging, the study reveals that people's jobs and lifestyles influence what they look for in products. Students and budget-conscious buyers mainly care about price and how much they can get for their money, while professionals tend to focus more on nutrition, how products look, and how reliable the brand is. This is in line with Vyas's (2016) observation that health and nutrition are becoming more important for better-educated, working people in cities in India. It also supports Wanninayake's (2008) idea that marketing should include eco-friendly and health-focused features along with traditional aspects like affordability and availability. For businesses, this means creating specific marketing messages that match the needs of different customer groups rather than using a general approach that works for everyone. For instance, campaigns for students could emphasize affordability and discounts for buying in bulk, while ads for professionals and families might highlight the health benefits, freshness, and sustainability of the packaging.

The increasing focus on sustainability in how consumers view products is another key trend. Over 70% of respondents said they care about eco-friendly packaging and are willing to pay more for it. This matches global findings by Laughland and Bansal (2011) and Rapert et al. (2010), who argued that consumers are increasingly rewarding brands that help reduce environmental issues. The preference for biodegradable materials, recyclable cardboard, and plastic-free alternatives shows that sustainability is no longer an extra feature but is now expected. Companies that include sustainable practices in product design and clearly explain these efforts can improve their market position and create stronger emotional ties with people who care about the environment. On the other hand, not addressing these sustainability expectations can hurt brand reputation and lose consumer trust.

Interestingly, the results show a move away from just focusing on price to making choices based on value. While affordability still matters, especially among younger people, factors like nutritional value, brand trust, and sustainable packaging now play a big role in purchase decisions. This reflects a wider change in Indian consumer behaviour, where rising incomes and access to global health and wellness trends have raised expectations for quality and ethical responsibility. This aligns with research suggesting that modern consumers are more ready to pay extra for products that match their values, whether those values are about health, sustainability, or authenticity (Pillai, 2016). This insight challenges the long-held belief that price is the main factor in emerging markets and opens up opportunities for consumer goods companies to stand out by focusing on qualities beyond price.

The study also highlights how important brand communication is in shaping what people think. Clear nutritional labels, information about where products come from, and visible sustainability claims can help build trust and reduce confusion. People in Ahmedabad seem to be very responsive to messages that show authenticity and a commitment to ethical practices. This is consistent with global marketing trends, where consumers now expect brands to be involved in positive change and to share their values openly. By working on clear labelling and trustworthy certifications, companies can increase how good their brand is seen and gain a better position in the market.

Conclusion

From a theoretical standpoint, the findings fit with the customer-based brand equity model, which says that brand associations, how good the product is seen to be, and customer loyalty are key to making a strong brand. The preference for local brands in Ahmedabad suggests that strong cultural connections and consistent quality have helped these brands build high brand equity. Additionally, the results support the idea of segmenting marketing and product design from consumer behaviour theory, which says that marketing strategies should be guided by demographic and personality factors to be most effective and impactful.

In addition to supporting existing theories, the study adds new knowledge by showing how factors like age, awareness of sustainability, and packaging choices are connected in an Indian urban setting. For example, the link between age and choice of packaging size gives real evidence that different generations have different preferences in consumer goods markets, a topic that hasn't been closely studied in Indian research. Also, the fact that people are willing to spend more on eco-friendly packaging shows a change in how consumers think about buying, which affects how companies set prices and design products.

These results have important real-world applications. Companies selling consumer goods in places like Ahmedabad and similar cities can improve their competitiveness by focusing on three main areas: building trust in local brands, creating packaging that caters to the needs of different age groups, and including sustainability in how they create products and communicate with customers. For instance, businesses might offer different package sizes, like big and small options, and use messages that talk about value, health, and the environment. At the same time, they should run campaigns that teach people about the benefits of using eco-friendly packaging and being mindful of

their consumption, which can help build a more loyal and active customer base.

While these findings are promising for brands that match what consumers want, they also show challenges for businesses that don't change. The increasing focus on sustainability, health, and real brand value makes product development and supply chain management harder. Firms need to go beyond just saying they are eco-friendly and actually improve their packaging, where they get their materials, and how they make products. If they don't, consumers – especially those in educated urban areas – might not believe them and could damage the company's reputation.

The study concludes that how people in Ahmedabad's consumer goods market see the quality of products is shaped by several things: trust in local brands, how packaging looks, awareness of nutrition, and concerns about the environment. The strong preference for Indian brands shows that people value cultural familiarity and consistency in quality when building loyalty. Packaging not only serves a practical purpose but also influences how people feel about a product, with age and family structure affecting how much product people buy. Differences in jobs also show how varied consumer needs are, suggesting that businesses need to use different strategies to meet these needs. Most importantly, the growing interest in sustainability and health means people are moving away from choosing based on price and more on what they get in return, which opens up chances for companies to come up with new ideas and stand out.

These conclusions have several important effects for both people working in the field and researchers. For those working in the field, the study suggests that putting effort into real brand value, sustainable packaging, and clear communication can help meet what customers want and build lasting relationships. For researchers, the study gives a good basis for future research into how different demographic and personality traits influence sustainability preferences when making buying decisions. Long-term studies could check if these trends get stronger over time, while bigger samples could help these findings apply to different parts of India.

This study helps us understand urban Indian consumer behaviour by showing that how people see product quality is a complex idea that includes things like cultural identity, health awareness, and environmental concerns. By making products and marketing efforts match these changing preferences, companies can not only gain more market share but also encourage more sustainable and responsible consumption. In a time when consumers expect brands to reflect their values, companies that include trust, quality, and sustainability in their main operations are likely to have better brand reputation, more profit, and long-term success in the competitive consumer goods market.

Limitations and Future Research

While this study gives useful information about how people in Ahmedabad see packaged goods, it's important to understand its limits to better understand the results and plan future research. One main limit is the small group of sixty-six people surveyed. Even though this number helped with meaningful analysis, it makes it hard to apply the findings to the whole population of Ahmedabad or other cities in India. A bigger group would make the results more reliable, reduce errors, and include a wider range of opinions, especially from people who are not often studied, like those from rural areas, older adults, or high-income professionals whose buying habits might be quite different.

Another issue is that the study used self-reported data, which can be influenced by people's desire to look good. Participants might say they care more about sustainability or health than they actually do, and might not admit to being motivated by price. This kind of bias is common in consumer studies and can affect results when people are asked about things like environmental concerns or ethical choices. Future studies could use methods like observing actual behaviour, looking at purchase records, or running experiments to track real buying habits rather than just what people say they do.

The study also looked at data all at once, which means it doesn't show how consumer behaviour changes over time. For example, buying habits might change during festivals or when the economy isn't stable. Future research could follow people over time to see if preferences for eco-friendly packaging, local brands, or healthy products are steady trends or just temporary changes due to certain situations.

The study focused only on Ahmedabad, which is a big city with many educated people and access to modern shopping centres. While this gives useful knowledge about city life, it doesn't apply well to smaller towns or rural areas where buying power, brand choices, and traditions are different. Future work could compare different cities or regions to find out what's similar and what's different, helping companies create better strategies for a country as varied as India.

The study also didn't look at all the factors that influence buying decisions. It mainly focused on things like perceived quality, packaging choices, trust in brands, awareness of nutrition, and sustainability. However, other elements like ads, word of mouth, online reviews, and sales promotions might also be important. Future research could include more factors like digital marketing, price deals, and social media interactions to better understand how people make buying decisions in a world that's very online-focused.

The qualitative parts of this study, which were based on short interviews and open questions from a few people, offered some useful insights. But they didn't go deep enough. More detailed methods like group discussions or in-depth studies could provide a better understanding of why people trust local brands, how they see sustainability claims, or what feelings drive their shopping. These deeper insights would work well with the statistical results and help companies create messages that really connect with what consumers value.

Lastly, this study didn't look at what happens after people buy something, like if they buy again, switch brands, or talk about the product online. Knowing this is important for building long-term loyalty and seeing the value of customers over time. Future studies could focus on how people's views on quality and sustainability influence their ongoing support, recommendations, and willingness to pay more in the future.
Despite these limitations, the findings are a good base for further research and practical use. By including bigger and more varied groups, using real behaviour data, and looking at things over time, future studies can better understand how people's views change with market trends, new rules, and shifts in what people care about. Researching differences between urban and rural areas, and looking at specific groups, will help businesses create better products that work well across India's different markets.

This study points out key areas where future research can build on what is already known to better understand how people view packaged goods. By looking at sample size, where the study is done, observing actual behaviour, and considering other influencing factors, future studies can provide more general, detailed, and useful insights that benefit both academics and the business world.

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RESEARCH

Investor Awareness and Perceptions of Robo-Advisory and Algorithmic Trading in India

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Executive Summary

Abstract

This study examines the awareness, perceptions, and adoption intentions of robo-advisory services and algorithmic trading among Indian retail investors. As financial technology continues to transform global investment practices, these innovations offer affordable, automated, and efficient solutions for portfolio management and trading. Despite their potential, investor awareness and adoption remain uneven. This research explores how demographic factors, financial literacy, risk tolerance, and technological comfort influence the willingness to use these tools. A structured survey of 128 retail investors provided primary data, supported by a comprehensive review of global and Indian literature. Statistical analysis, including chi-square tests, t-tests, correlation analysis, and logistic regression, revealed that 73% of respondents were aware of robo-advisory services, though only 41% understood their functionality, while algorithmic trading awareness stood at 38%. Younger investors and those with higher financial literacy showed stronger interest in adopting these technologies. Trust in regulation, digital comfort, and perceived ease of use positively correlated with adoption intentions. However, concerns regarding data security, lack of human interaction, and regulatory clarity limited adoption. The study contributes to understanding fintech adoption in emerging markets, providing insights for policymakers, fintech developers, and educators to design trust-building mechanisms, investor education programs, and hybrid advisory models that combine automation with human guidance.

Keywords

Robo-advisory, Algorithmic trading, financial technology, Investor perception, Fintech adoption, Retail investors

Introduction

The global financial services industry is undergoing a profound transformation as technology reshapes the way individuals invest, trade, and access financial advice. Financial technology (fintech) innovations have introduced powerful tools that automate investment management, streamline trading, and expand market participation. Two of the most influential developments in this space are robo-advisory services and algorithmic trading (algo trading). These technologies challenge traditional approaches to wealth management and trading by reducing costs, improving efficiency, and minimizing emotional biases in decision-making. In emerging markets such as India, where financial inclusion and digital adoption are rapidly growing, understanding investor awareness, perceptions, and adoption behaviour regarding these tools is essential for building effective financial ecosystems and regulatory frameworks.

Robo-advisory services are online platforms that use algorithms to design and manage investment portfolios based on investors' goals, risk tolerance, and time horizons. By automating asset allocation, rebalancing, and tax optimization, robo-advisors provide a cost-effective and accessible alternative to traditional financial advisors. Their 24/7 availability, low minimum investment requirements, and user-friendly interfaces make them particularly attractive to first-time and younger investors. They also democratize access to financial planning by offering goal-based investing strategies, diversification, and continuous portfolio monitoring. However, despite their benefits, robo-advisors face challenges such as limited personalization for complex financial situations, dependence on technology, lack of human interaction, and concerns about data privacy and security. These limitations raise questions about whether investors fully trust such platforms and whether hybrid models combining automation with human guidance—could encourage greater adoption.

Algorithmic trading represents another major shift in investment practice. It uses computer programs to automatically execute trades based on pre-defined rules relating to price, timing, volume, and other market indicators. While initially dominated by institutional investors, advances in fintech have made algorithmic trading more accessible to retail investors through user-friendly platforms. Algo trading offers significant advantages, including lightning-fast execution, discipline in following trading strategies, and improved risk management through automated stop-loss and take-profit mechanisms. It also allows traders to backtest strategies using historical data before deploying them in real markets. Nevertheless, algo trading is often perceived as highly technical, requiring programming knowledge and robust infrastructure that many retail investors lack. Moreover, it introduces unique risks, including system failures, coding errors, and potential contributions to market volatility or flash crashes, which increase the need for regulatory oversight and investor education.

India provides an ideal setting to study these developments. The country has witnessed exponential growth in its fintech sector, supported by initiatives such as Digital India, Jan Dhan Yojana, and the Unified Payments Interface (UPI). These programs have brought millions of citizens into the formal financial system and encouraged adoption of digital platforms. Yet, the uptake of advanced investment technologies remains lower compared to developed markets. Many retail investors are still unfamiliar with robo-advisory and algorithmic trading, and those who are aware may not fully understand how these services work or whether they align with their goals. Studies indicate that awareness of robo-advisory services is higher among younger, tech-savvy investors, while algorithmic trading remains largely associated with professional traders and high-net-worth individuals. This gap highlights the importance of examining how demographic factors, financial literacy, technological comfort, and trust in regulation influence adoption decisions.

Existing global literature suggests that robo-advisors improve financial inclusion by lowering entry barriers and offering affordable advice, particularly for individuals with low income or limited access to traditional advisory services. Research by (Dhar, 2023) and (Kassler, 2021) emphasizes the importance of trust and transparency in encouraging adoption, while (Xu, 2023) and (Białowolski, 2022) note their role in enhancing financial literacy and promoting disciplined investing. However, (Johnsen, 2024) observes that robo-advisors do not consistently

outperform traditional investment strategies, and (BETTER FINANCE, 2022) reports persistent concerns regarding performance transparency. Algorithmic trading research similarly highlights its efficiency and contribution to liquidity and price discovery (Hendershott, 2011) but warns of potential market instability caused by high-frequency strategies. These findings, mostly from Western markets, may not fully capture the unique socio-economic and regulatory dynamics of India, where digital infrastructure, financial literacy levels, and investor trust differ significantly.

Understanding investor perceptions is crucial because they shape willingness to adopt new financial technologies. Perceived ease of use, cost-effectiveness, and risk influence adoption decisions, as does confidence in regulatory oversight. Concerns about losing the human touch, data breaches, and algorithmic bias may deter adoption even when platforms are technically sound. The growing popularity of hybrid advisory models suggests that investors value a balance between automation and personal interaction. Platforms that combine algorithm-driven portfolio management with periodic human consultation may bridge the trust gap and encourage wider use.
This research addresses several gaps in the existing literature by focusing specifically on Indian retail investors. It investigates their awareness of robo-advisory and algorithmic trading, examines how demographic and behavioural variables influence adoption, and explores whether hybrid models could improve investor trust and acceptance. By doing so, it provides insights into how fintech platforms can design better services and how policymakers can create enabling regulatory frameworks.

The objectives of this study are fourfold: first, to assess the level of awareness of robo-advisory services and algorithmic trading among Indian retail investors; second, to analyse their perceptions of these technologies, including perceived benefits, risks, and trust factors; third, to identify the personal and behavioural factors such as age, financial literacy, risk tolerance, and digital comfort—that predict adoption intention; and fourth, to evaluate the potential of hybrid models to enhance investor confidence and adoption. By achieving these objectives, the research contributes to the academic discourse on fintech adoption in emerging markets and offers practical implications for fintech companies, educators, and regulators seeking to promote responsible and inclusive digital investing.

Literature Review

The rapid advancement of financial technology has significantly altered the investment landscape, leading to the emergence of robo-advisory services and algorithmic trading as disruptive innovations. Scholars and industry experts have extensively studied these developments, focusing on their functionality, adoption, performance, and implications for the financial services industry. This review synthesizes global and Indian research on robo-advisory and algorithmic trading, highlighting their advantages, limitations, and impact on investor behaviour, financial literacy, and market structures. It also identifies gaps in the existing literature, particularly in the context of Indian retail investors, and establishes the theoretical foundation for this study.

Robo-advisory services use automated algorithms to provide investment advice, construct portfolios, and manage assets without direct human intervention. According to (Dhar, 2023), advances in artificial intelligence and data analytics have made robo-advisors capable of delivering highly customized and cost-effective financial planning solutions. These platforms typically assess an investor's risk tolerance, goals, and time horizon through a questionnaire and then allocate assets across exchange-traded funds (ETFs), mutual funds, or other low-cost instruments. Their automation enables continuous monitoring and rebalancing, ensuring alignment with the investor's objectives while reducing the influence of emotional biases. (Kassler, 2021) emphasizes that transparency and trust are central to the adoption of robo-advisory services, as investors must have confidence in the algorithms' ability to make sound decisions.

A major advantage of robo-advisors is their ability to democratize access to financial advice. (Xu, Financial inclusion

through robo-advisory platforms: A case for emerging economies, 2023) argue that robo-advisors lower entry barriers by offering low minimum investment requirements, thereby including investors who might otherwise be excluded from professional financial advice due to cost constraints. (Białowolski, Financial literacy and the acceptance of robo-advisors, 2022) support this view, highlighting that robo-advisors improve financial literacy by providing educational tools and clear explanations of portfolio choices, empowering retail investors to better understand their investments. These platforms also promote diversification and encourage disciplined, long-term investing strategies, which can enhance financial inclusion and wealth accumulation.

Despite these benefits, the literature identifies several limitations. Johnsen (Dhar, 2023) notes that robo-advisors, while suitable for inexperienced or low-asset investors, do not consistently outperform traditional investment strategies and may fail to account for complex, individualized financial needs. BETTER FINANCE (2022) reports that performance transparency remains a persistent weakness, as many platforms do not disclose sufficient historical return data or algorithmic methodology, limiting investors' ability to make informed comparisons. Additionally, robo-advisors lack the human touch that some investors value, particularly those with nuanced financial circumstances requiring in-depth discussion or reassurance. (Kassler, Human touch in fintech: Evaluating hybrid advisory models, 2023) propose that hybrid advisory models combining algorithmic efficiency with access to human advisors could mitigate these concerns by providing both cost-effectiveness and personalized support.
Another critical theme in robo-advisory research concerns investor trust and behavioural responses. (Xu, Trust, technology, and generational shifts in fintech usage, 2024) finds that generational differences shape attitudes toward digital financial tools, with younger investors demonstrating greater openness to automation due to their familiarity with technology, whereas older investors show reluctance stemming from lower digital comfort and higher need for personal interaction. Studies also indicate that investors' financial literacy and risk tolerance strongly influence their willingness to adopt robo-advisors. When investors understand the underlying investment principles and trust that regulatory frameworks will protect them, they are more likely to rely on automated platforms.

Parallel to the growth of robo-advisory, algorithmic trading has revolutionized how market participants execute trades. Algorithmic trading employs pre-programmed strategies that incorporate factors such as price, volume, and technical indicators to automate trade execution. Hendershott (2011) demonstrates that algorithmic trading improves market efficiency by narrowing bid-ask spreads, enhancing liquidity, and facilitating faster price discovery. These strategies include trend-following algorithms, which seek to capture gains from market momentum, mean reversion strategies, which exploit temporary price deviations, and arbitrage strategies, which capitalize on price discrepancies across markets. Market-making algorithms also provide continuous bid and ask quotes, contributing to orderly markets and improving depth.

Algo trading offers several well-documented advantages. It eliminates emotional decision-making by adhering strictly to predefined rules, enabling disciplined trading. It also executes trades at microsecond speeds, capturing fleeting opportunities that human traders cannot exploit. Backtesting capabilities allow traders to evaluate and optimize strategies using historical data, reducing risk before committing real capital. Risk management is strengthened through automated stop-loss and take-profit orders that limit exposure to adverse price movements. As a result, algorithmic trading can increase profitability and improve the consistency of returns, particularly for institutional investors managing large portfolios.

Nonetheless, algorithmic trading presents notable challenges. Its complexity requires programming knowledge and sophisticated technological infrastructure, which may deter retail investors (Li, 2021). Maintaining and debugging algorithms can be resource-intensive, and even small coding errors can lead to substantial financial losses, sometimes referred to as "fat-finger errors." Overreliance on historical data risks overfitting strategies that perform well in backtests but fail under changing market conditions. Moreover, the speed and scale of high-frequency trading (HFT) have been implicated in sudden market disruptions, such as flash crashes, raising concerns about systemic risk. Regulators have responded by introducing oversight mechanisms, including mandatory testing

environments, circuit breakers, and monitoring frameworks. In India, the Securities and Exchange Board of India (SEBI) has implemented a regulatory sandbox to encourage innovation while mitigating risk.

Literature exploring investor perceptions of algorithmic trading remains relatively sparse, particularly in emerging markets. Research generally suggests that retail investors perceive algo trading as complex and riskier compared to traditional trading methods. (Xu, Trust, technology, and generational shifts in fintech usage., 2024) highlights that trust in technology and confidence in regulatory oversight play decisive roles in encouraging adoption. Younger and more technologically adept investors express greater interest in learning algorithmic trading strategies, while older participants remain cautious, fearing technical errors or unfair market manipulation.

Both robo-advisory and algorithmic trading contribute to the broader theme of financial inclusion and the democratization of investing. They offer scalable solutions that can serve large populations at relatively low cost, a crucial factor for markets like India where a substantial share of the population remains underinvested. By automating portfolio management and trade execution, these technologies reduce barriers to entry and support efficient capital allocation. However, they also introduce new challenges for regulators, who must balance innovation with investor protection. The literature consistently calls for clearer disclosure standards, improved algorithmic transparency, and stronger investor education programs to build trust and encourage responsible adoption.

Hybrid advisory models have emerged as a recurring solution in the literature to address the limitations of fully automated systems. These models allow investors to benefit from algorithmic efficiency while consulting a human advisor for more complex decisions. Research by (Kassler, Human touch in fintech: Evaluating hybrid advisory models, 2023) suggests that hybrid models increase adoption by alleviating trust concerns and providing emotional reassurance during volatile markets. (Białowolski, The future of hybrid robo-advisory models. , 2024) notes that such models may particularly benefit emerging markets, where investors are still building confidence in digital financial services.

Despite the growing body of global research, significant gaps remain in the context of India. Much of the literature focuses on Western economies with mature digital ecosystems, higher levels of financial literacy, and established regulatory frameworks. Indian investors differ in terms of socio-economic diversity, technological access, and behavioural attitudes toward automation. Few studies have examined how Indian retail investors perceive robo-advisory and algorithmic trading, what factors drive or inhibit their adoption, or how hybrid models might fit into the local financial culture. Furthermore, there is limited empirical data linking investor demographics, financial knowledge, and regulatory trust to adoption intentions in the Indian market.

This study addresses these gaps by providing primary data on Indian retail investors' awareness, perceptions, and adoption behaviour regarding robo-advisory services and algorithmic trading. By combining descriptive and inferential statistical analysis, it seeks to uncover how demographic variables such as age, gender, income, and education, along with psychological factors like risk tolerance and digital comfort, influence willingness to adopt these technologies. Additionally, it explores whether hybrid advisory models could increase investor confidence and bridge the gap between fully automated systems and traditional financial advice.

Research Methodology

This study adopts a quantitative, cross-sectional research design with a descriptive and exploratory focus to investigate awareness, perceptions, and adoption intentions of robo-advisory services and algorithmic trading among Indian retail investors. A quantitative approach enables the researcher to systematically collect numerical data, measure relationships between variables, and identify significant patterns influencing adoption behaviour. The cross-sectional nature of the study captures investor attitudes and awareness levels at a single point in time, allowing for an accurate snapshot of the current state of fintech adoption in India. This approach is particularly

appropriate because fintech adoption evolves rapidly, and capturing timely insights is essential for informing practitioners, policymakers, and platform developers.

The research design emphasizes clarity and objectivity by relying on structured data rather than subjective interpretation. Descriptive elements summarize the characteristics of respondents, including demographics, levels of financial literacy, and digital comfort. Exploratory analysis investigates how these factors correlate with perceptions of robo-advisory and algorithmic trading, identifying which combinations of variables most strongly predict adoption intention. Together, these components provide a comprehensive understanding of investor behaviour in relation to emerging financial technologies.

The study relies on a structured online questionnaire as its primary instrument for data collection. The questionnaire was carefully designed to measure all constructs relevant to the research objectives, drawing from established theoretical models such as the Technology Acceptance Model (TAM) and Unified Theory of Acceptance and Use of Technology (UTAUT). Using these models ensures that the study captures key psychological and behavioural drivers, including perceived ease of use, perceived usefulness, trust, and risk perception, which are crucial determinants of technology adoption.

The questionnaire consists of five main sections. The first section collects demographic information such as age, gender, income, education level, occupation, and city of residence, which provides context for understanding adoption patterns across different investor groups. The second section examines investment behaviour, including the type of assets held, investment experience, and trading frequency. These measures reveal the level of sophistication among participants and help differentiate between novice and experienced investors.

The third section measures awareness of robo-advisory services and algorithmic trading. Respondents indicate whether they have heard of these technologies and rate their understanding of their functionality. This section captures the knowledge gap that may exist between recognition of the term and comprehension of how the technology works. The fourth section explores perceptions and attitudes using a five-point Likert scale, ranging from "strongly disagree" to "strongly agree." It evaluates user perceptions regarding trustworthiness, ease of use, affordability, perceived risk, and suitability for various investment needs. These items allow for an in-depth understanding of psychological barriers and motivators influencing adoption.

The final section assesses behavioural intention to adopt robo-advisory and algorithmic trading. Respondents report their willingness to use these services in the future and whether they would prefer hybrid models that combine algorithmic recommendations with human consultation. This section provides actionable insights into the types of services investors are likely to adopt and the conditions under which they would feel comfortable doing so.

The questionnaire underwent pretesting with a small group of 10 investors to ensure content validity and clarity. Feedback from the pretest led to refinements in wording, sequencing, and response scales to improve comprehension and reduce ambiguity. The reliability of the perception-related items was confirmed through Cronbach's Alpha, which exceeded 0.72, indicating internal consistency and the suitability of the items for statistical analysis.

Data analysis involved both descriptive and inferential statistical techniques, conducted using IBM SPSS version 26 and Microsoft Excel. Descriptive analysis summarized demographic characteristics, awareness levels, and mean perception scores. These results offered a clear overview of the sample and established a foundation for more advanced analysis. Inferential statistics tested the relationships between independent variables such as age, gender, income, financial literacy, and digital comfort and dependent variables like awareness, trust, and intention to adopt robo-advisory and algorithmic trading.

Chi-square tests examined associations between categorical variables. For example, the study used chi-square analysis to determine whether awareness of robo-advisory services varied significantly by education level or age group. These tests revealed whether differences in awareness were statistically meaningful or likely due to chance. Independent samples t-tests compared mean perception scores between two groups, such as male versus female investors, or younger versus older participants. For instance, a t-test measured whether men exhibited higher levels of trust in robo-advisors compared to women.

Analysis of Variance (ANOVA) extended these comparisons across more than two groups, allowing for the identification of differences in trust, willingness to adopt, or perceived risk across income levels or investment experience categories. Post hoc tests followed significant ANOVA results to pinpoint where differences occurred. Pearson correlation coefficients quantified the strength and direction of relationships between continuous variables, such as the link between financial literacy and intention to adopt robo-advisory services or between digital comfort and willingness to learn algorithmic trading. These correlations clarified how much each factor contributed to adoption behaviour.

Binary logistic regression formed the core of the predictive modelling in this study. The dependent variable represented whether respondents were willing to consider using robo-advisory services (coded as 1 for "yes" and 0 for "no"). Independent variables included demographic factors, financial literacy scores, digital comfort ratings, and trust in regulation. The logistic regression model identified which factors significantly predicted adoption intention while controlling for the influence of other variables. Model fit was assessed using the chi-square statistic and pseudo R^2 measures, ensuring the model explained a meaningful proportion of variance in adoption decisions. Odds ratios provided intuitive interpretation by indicating how much a one-unit change in an independent variable increased the likelihood of adopting robo-advisory services.

The methodology also addressed ethical considerations rigorously to ensure the integrity of the research process. Participants were informed about the purpose of the study, the voluntary nature of participation, and their right to withdraw at any point without penalty. The researcher assured confidentiality by not collecting personally identifiable information such as names, phone numbers, or email addresses. Responses were stored securely, used exclusively for academic analysis, and presented in aggregate form to prevent identification of individual participants. The research adhered to the ethical guidelines of Shanti Business School and avoided involving vulnerable populations.

This robust methodological framework enables the study to generate reliable, valid, and actionable insights into the awareness, perceptions, and adoption behaviour of Indian retail investors with respect to robo-advisory and algorithmic trading. By employing a theoretically grounded questionnaire, pretesting its items, and applying rigorous statistical techniques, the study ensures that its findings contribute meaningfully to academic literature and offer practical guidance to fintech developers, educators, and policymakers seeking to foster responsible and inclusive fintech adoption in India.

Data Analysis

The study asked 128 Indian retail investors about their experiences, which included a mix of different ages, education levels, jobs, and how much money they earn. This wide range of people helps ensure that the results show a full picture of what different kinds of investors think and do when it comes to using technology in finance. In terms of gender, 62% of the people surveyed were men and 38% were women, which is similar to the usual pattern seen in Indian stock markets where more men take part than women.

Looking at ages, 32% were between 18 and 25, 40% were between 26 and 35, 20% were aged 36 to 50, and 8% were older than 50. This shows that most of the people surveyed were under 35, which matches the trend of younger people who are more comfortable with digital tools and are starting to get more involved in investing.

When it comes to education, 60% had postgraduate degrees, 28% had undergraduate degrees, and 12% had professional certifications. This means the group was quite well-educated, which suggests they were likely to understand financial matters and could critically assess new fintech solutions. In terms of jobs, 46% were regular employees, 22% were self-employed or ran their own businesses, 18% were students, and 14% were retired or belonged to other categories.

Regarding income, 34% made less than ₹5 lakhs a year, 38% earned between ₹5 and ₹10 lakhs, and 28% made more than ₹10 lakhs. This even spread across different income levels makes it possible to study if how much money someone has influences how aware they are, how they feel about, and how likely they are to use fintech platforms.

Table 1: Demographic Profile of Respondents (n = 128)

Demographic Variable	Category	Percentage
Gender	Male	62%
	Female	38%
Age Group	18–25	32%
	26–35	40%
	36–50	20%
	Above 50	8%
Education	Undergraduate	28%
	Postgraduate	60%
	Professional Certifications	12%
Occupation	Salaried	46%
	Self-employed	22%
	Students	18%
	Retired/Others	14%
Annual Income	Below ₹5 Lakhs	34%
	₹5–10 Lakhs	38%
	Above ₹10 Lakhs	28%

This group of people from different backgrounds makes the results more reliable because it includes investors with different amounts of experience in the market, different income levels, and different levels of exposure to digital tools. It also lets us compare different subgroups, like looking at whether age, income, or education affects how aware people are of and how likely they are to use robo-advisory services and algorithmic trading.

Awareness of Robo-Advisory and Algorithmic Trading

The study shows there's a noticeable difference in how aware investors are of robo-advisory services compared to algorithmic trading. About 73% of people know about robo-advisory services, which means these platforms are becoming more recognized in the Indian financial world. However, only 41% of them truly understand how robo-advisors work, like how they build and adjust investment portfolios. This gap between knowing about something and really understanding it is a big challenge for fintech adoption. Investors might know about robo-advisors, but they might not feel confident enough to use them because they don't fully grasp how they operate.

When it comes to algorithmic trading, awareness is much lower. Only 38% of people know about it, and just 21% feel confident they understand how it works. This low awareness shows that algorithmic trading is seen as something complicated and specialized, often linked to professional traders or big financial institutions. The results indicate that algorithmic trading is still in the early stages for regular investors in India, and more education could help make it more accessible.

The study also found that awareness isn't the same for everyone. For robo-advisory services, being more educated and younger increases the chances of knowing about them. For algorithmic trading, people who have more investment experience and higher incomes are more likely to be aware of it. These findings suggest that when creating education programs, it's important to consider different groups of people to make sure the information is relevant and effective.

Table 1: Awareness Levels of Robo-Advisory Services and Algorithmic Trading

Technology	Aware (%)	Understand Functionality (%)	Key Chi-Square Associations (p-value)
Robo-Advisory Services	73%	73%	Education ($\chi^2 = 10.43$, $p < 0.01$), Age ($\chi^2 = 8.12$, $p < 0.05$)
Algorithmic Trading	38%	21%	Investment Experience & Income ($\chi^2 = 7.68$, $p < 0.05$)

This table shows the difference between having some knowledge and truly understanding, along with the factors related to people's awareness. The results make it clear that although robo-advisory services are more well-known now, they still need better education to help people understand them better. On the other hand, algorithmic trading is still a niche area where only experienced and wealthier investors are aware of it.

Perceptions of Robo-Advisory Services

The people who took part in the study had mostly positive opinions about robo-advisory platforms, as shown by their ratings on the Likert scale. Table 2 shows the average scores and how much they varied for different statements about their views. The results show that investors think robo-advisors are easy to use, affordable, and especially good for people who are just starting to invest. The highest score (4.4) was for the statement "suitable for first-time investors," meaning that people see these platforms as helpful tools for newcomers who might not be confident in managing their own investments.
Cost was another big positive point, with an average score of 4.3. This makes sense because robo-advisory services are known for being cheaper than working with traditional financial advisors. People also thought the platforms were easy to use (average of 4.2), which shows that how the platform is designed and how simple it is to navigate are important in making people want to use them.

Trust, on the other hand, had a lower score of 3.7. This suggests that some investors are still unsure about fully trusting automated systems to handle their money. Even though the average score for wanting to use robo-advisors was positive (4.0), the lower trust score shows that worries about having control, keeping data safe, and how the algorithms make decisions are stopping some people from fully using these services. These findings suggest that robo-advisory companies could improve by being more open and clear about how they manage risks, and maybe offer a mix of automated and human advice to help people feel more comfortable.

Table 2: Perceptions of Robo-Advisory Services (n = 128)

Statement	Mean	Std. Dev.
Robo-advisors are user-friendly	4.2	0.68
More affordable than traditional advisors	4.3	0.61
Suitable for first-time investors	4.4	0.70
I trust robo-advisors to manage investments	3.7	0.88
I would consider using a robo-advisor	4.0	0.77

The high scores in affordability, ease of use, and suitability for beginners show that robo-advisory services are good at drawing in first-time investors who care about saving money and having an easy experience. However, the lower trust score means that fintech companies still need to work on educating investors, improving security, and being clear in their communication to gain more trust and get more people to use their services.

Perceptions of Algorithmic Trading

Respondents had more cautious and mixed views about algorithmic trading compared to robo-advisory services. Table 3 shows the average scores and how much they varied for key statements about these services. The highest score (mean = 4.3) was for the need for stronger rules and oversight, showing that people generally believe algorithmic trading needs strict management to protect investors from big market swings, unfair actions, or dangers to the whole system. This matches what is discussed in studies that stress the importance of checking algorithms, having emergency stops, and using testing environments for high-speed trading.

Respondents also saw some benefits of algorithmic trading, scoring it a 4.2 on the idea that it allows for faster trades. This shows that investors see the value in using automation to quickly take advantage of market chances. However, the score of 4.0 for "too complex for the average investor" means many people feel unsure or overwhelmed by the technology involved. This complexity may stop many, especially those who are not as experienced or comfortable with digital tools, from using algorithmic trading widely.

People were also worried about mistakes or system crashes, with a moderate concern (mean = 3.9), suggesting they are nervous about the reliability of automated systems and the money they might lose if something goes wrong with the software or internet connection. Interest in learning how to use algorithmic trading was scored around 3.6 overall, but younger people showed more interest, with those aged 18–25 scoring 4.1. This difference between age groups hints at a possible future trend: as younger, tech-savvy investors become more familiar with the market, there may be more demand for training and easier tools to use algorithmic trading.

Table 3: Perceptions of Algorithmic Trading (n = 128)

Statement	Mean	Std. Dev.
Offers faster execution	4.2	0.64
Too complex for the average investor	4.0	0.75
Risk of technical errors or system failures	3.9	0.81
I want to learn algorithmic trading	3.6	0.89
Needs stronger regulatory oversight	4.3	0.59

These results show that algorithmic trading is seen by retail investors as both appealing and scary. People understand its fast pace and how it can help with making better trading decisions, but they are still worried about how complicated it is and the possible dangers involved. The strong demand for more regulation suggests that protecting investors is key to building trust. To help, platforms and teaching resources can provide easier ways to build algorithms, practice trading in a safe environment, and offer clear, step-by-step guides to make it easier to start and reduce worries about things going wrong with the system.

Independent Sample T-Test Results

Independent samples t-tests were used to check if trust in robo-advisory services and interest in algorithmic trading differed significantly between genders and age groups. The results showed clear differences in both areas. For trust in robo-advisory services, men showed higher levels of trust (average = 3.9) compared to women (average = 3.4). This difference was statistically significant, with $t(126) = 2.83$ and $p < 0.01$. This suggests that gender influences how much people trust automated investment platforms. It may be because men are more likely to take risks or are more used to technology.

There were also clear age differences in interest in algorithmic trading. People aged 35 or younger had much higher interest (average = 3.9) compared to those older than 35 (average = 3.1). This difference was also statistically significant, with $t(126) = 3.21$ and $p < 0.01$. This indicates that younger investors are more open to trying out new trading technologies and may be more interested in learning about algorithmic trading strategies.

Table 4: Independent Samples t-Test Results

Variable	Group 1	Mean (M)	Group 2	Mean (M)	t-value	p-value	Interpretation
Trust in Robo-Advisory	Male	3.9	Female	3.4	2.83	$p < 0.01$	Males report significantly higher trust
nterest in Algorithmic Trading	Age ≤ 35	3.9	Age > 35	3.1	3.21	$p < 0.01$	Younger investors show significantly greater interest

These results support the same trends we saw before: men and younger people are more open to using fintech services. This means that marketing and education efforts should focus on helping women feel more confident about fintech and supporting older investors with the knowledge they need to understand it better.

Correlation Analysis

Pearson correlation coefficients were used to look at how different psychological and behavioral factors relate to the adoption of fintech. The findings show several important positive links that help explain why some investors are more willing to use robo-advisory services and algorithmic trading.

Financial knowledge has a strong positive link with the intention to use robo-advisors ($r = 0.42$, $p < 0.01$). This suggests that investors who know more about finance are more likely to trust automated systems for their investments. They probably understand things like how to spread investments across different assets and the value of regularly adjusting portfolios. Financial knowledge also has a stronger positive link with interest in algorithmic trading ($r = 0.53$, $p < 0.01$), meaning that those with more financial knowledge are not only more familiar with these technologies but are also more interested in using them to develop advanced trading strategies.

Being comfortable with digital tools is also important. Comfort with technology is positively linked to readiness to try new financial technologies ($r = 0.39$, $p < 0.01$), showing that investors who feel confident using online

platforms are more open to exploring fintech solutions. Trust in financial regulators also has a significant positive connection with the willingness to use fintech ($r = 0.36$, $p < 0.01$), highlighting that strong regulation helps build investor confidence.

Table 5: Pearson Correlation Results

Variable Pair	Pearson r	Significance (p-value)	Interpretation
Financial Knowledge ↔ Intention to Use Robo-Advisors	0.42	$p < 0.01$	Greater financial knowledge strongly predicts adoption of robo-advisory services
Financial Knowledge ↔ Interest in Algorithmic Trading	0.53	$p < 0.01$	Financially literate investors are more motivated to explore algorithmic trading
Digital Comfort ↔ Readiness to Adopt Fintech	0.39	$p < 0.01$	Comfort with technology increases likelihood of experimenting with fintech
Trust in Regulators ↔ Willingness to Use Fintech	0.36	$p < 0.01$	Higher trust in regulators boosts fintech adoption intention

These findings show that having knowledge, being able to use digital tools, and trusting institutions are important factors that help people start using fintech. Investors who know about finance and feel comfortable with technology are more likely to try out robo-advisory and algorithmic trading services. Similarly, when people trust the regulatory authorities, they feel more secure knowing their money and personal information are safe, which makes them more willing to adopt these financial technologies.

Logistic Regression: Predicting Robo-Advisory Adoption

A binary logistic regression was used to determine which demographic and behavioral factors are important in predicting people's willingness to use robo-advisory services. The main outcome was whether people said they would consider using these services, with 1 meaning yes and 0 meaning no. The factors considered were age, gender, financial knowledge, comfort with technology, and trust in regulations.

The results showed that the model was statistically significant, with a chi-square value of 32.2 and a p-value less than 0.001, meaning the factors reliably help tell the difference between people who are willing and those who are not.

The Nagelkerke R-squared value of 0.41 means the model explains 41% of the variation in people's willingness to adopt robo-advisors, which is a strong level of explanation for behavioral studies. The model also correctly predicted 78% of the cases, showing it is quite effective at identifying who is likely to use these services.

Table 6: Binary Logistic Regression Predicting Robo-Advisory Adoption

Predictor	B (β)	p-value	Exp(B)	Interpretation
Age	-0.42	0.02	0.66	Younger investors are significantly more likely to adopt robo-advisors
Financial Literacy	0.88	0.001	2.41	Higher financial literacy more than doubles the odds of adoption
Digital Comfort	0.91	0.003	2.48	Digitally active users are about 2.5 times more likely to adopt
Trust in Regulation	0.56	0.04	1.75	Greater trust in regulatory bodies significantly increases likelihood of adoption
Gender	0.29	0.17	1.34	Not statistically significant

The findings indicate that age, financial knowledge, comfort with technology, and belief in regulations are all important factors that influence whether people use robo-advisory services. Younger people are more likely to adopt these services, as shown by the negative relationship between age and adoption. Financial knowledge and tech comfort are especially strong factors: for every unit increase in financial knowledge, the chance of using a robo-advisor more than doubles (Exp(B) = 2.41), and for every unit increase in tech comfort, the likelihood rises nearly 2.5 times (Exp(B) = 2.48). Trust in regulations is also important, as it shows that people are more willing to use these services when they feel confident about investor protections. Although gender is somewhat linked to adoption, it didn't reach a level of statistical significance, meaning that trust and knowledge are more important than gender alone.

This model shows that improving financial education and digital skills can help boost the use of fintech services. It also highlights the importance of clear and trustworthy regulations to encourage more people to use robo-advisory platforms.

Preference for Hybrid Advisory Models

The results show that investors clearly favor hybrid advisory models that mix human advice with automated portfolio management. Overall, 62% of the people surveyed said they prefer a combination of human and automated services instead of full automation. This preference is even stronger in certain groups: 72% of investors who are 35 years or older, and 69% of those earning more than 10 lakh rupees a year, said they like hybrid solutions. These findings suggest that while investors are becoming more comfortable with technology in investing, many still rely on the comfort, responsibility, and personalized advice that human advisors offer.

The feedback from respondents explains why they have this preference. They mentioned needing emotional support and reassurance, especially during times when the market is uncertain, which automated systems can't provide. Many also want someone to hold accountable for big financial decisions. Additionally, some participants said that planning for the long term is harder without human involvement, indicating they see human advisors as partners in building their financial future, not just as people who execute trades.

Table 7: Preference for Hybrid Advisory Models

Group	% Preferring Hybrid Model	Key Motivations
Overall Sample	62%	Emotional support, reassurance, human accountability
Age > 35	72%	Guidance for long-term planning, reduced anxiety during volatility
Income > ₹10 Lakhs	69%	Trusted advice for complex portfolios, shared responsibility

These findings highlight the need to create advisory systems that mix technology with human knowledge. As more people use fintech, having human support is still very important for customer happiness, especially for older and wealthier investors who often have more complicated financial goals. Fintech companies can meet this need by providing mixed services that let investors take advantage of automated systems for efficiency, while still being able to get help from real advisors for important choices and personalized advice.

Open-Ended Feedback Themes

The feedback people gave helps explain the numbers we saw, showing the real reasons behind their feelings about using fintech. Three main ideas came up from their comments: worry about fully automated systems, wanting to

learn more about finance, and being nervous about how safe their data is and how clear the decisions are.

First, a lot of people were unsure about trusting fully automatic systems for managing their investments. They were worried that automated tools, like robo-advisors and algorithm-driven trading platforms, might not handle big market problems well, like stock market crashes, or could make mistakes because of software issues. Some said these systems can't understand unique personal situations, like sudden financial emergencies or changes in goals, so having a human check in is still important.

Second, many people wanted more education on financial topics. They said they would like to learn through courses, tutorials, or guides on the platforms. They wanted to understand how these automated systems work and also the basic investing ideas that guide the recommendations. This shows that teaching people more could help them move from knowing about fintech to actually using it, as we saw in the numbers.

Lastly, people repeatedly mentioned concerns about keeping their data safe and being clear about how decisions are made. They wanted to be sure their personal and financial information is kept secure and not used without permission. They also wanted more information on how algorithms decide things, like which factors are used when investing or trading. This need for transparency shows they want to trust these tech-based financial tools more.

Table 8: Key Themes from Open-Ended Feedback

Theme	Representative Concerns	Interpretation
Uncertainty about Full Automation	Fear of market crashes, algorithmic errors, lack of personal context	Hybrid models and human oversight may encourage adoption
Desire for Financial Education	Need for courses, tutorials, and guides to understand tools and investing principles	Fintech providers and educators should create training programs to boost literacy
Concerns about Data Security & Transparency	Worries about misuse of personal data and opaque decision-making processes	Platforms must strengthen security, provide algorithm explanations, and improve trust

These findings show that trust, openness, and understanding of finance are still key factors in people using financial technology. By focusing on strong privacy rules, explaining how algorithms work, and offering easy-to-understand learning materials, we can boost people's confidence and help them use automated investment tools and algorithm-based trading systems more quickly.

Discussion

The findings of this study offer a comprehensive view of how Indian retail investors understand, perceive, and engage with robo-advisory services and algorithmic trading. The analysis shows that while awareness of robo-advisory is relatively high, comprehension remains limited, and actual usage rates are modest. Awareness of algorithmic trading is substantially lower, with a smaller proportion of investors understanding its operation or feeling comfortable using it. These findings align with global research, which consistently reports that technological familiarity, financial literacy, and trust are key determinants of fintech adoption. This section discusses the results in light of existing literature, interprets their significance for fintech adoption in India, and provides a set of conclusions that integrate theoretical insights with practical implications for industry stakeholders, policymakers, and educators.

One of the most striking results is that 73% of respondents reported awareness of robo-advisory services, yet only

41% demonstrated a clear understanding of their functionality. This gap between recognition and comprehension is critical because awareness alone does not guarantee adoption. Investors may have heard of robo-advisors through advertisements or online platforms, but without a deep understanding of how portfolios are constructed, rebalanced, and optimized, they may hesitate to trust automated systems with their money. This finding supports the observation by Białowolski and Weistroffer (2022) that education and awareness significantly influence adoption. By improving financial literacy and clarifying the inner workings of these platforms, fintech providers can address investor uncertainty and increase confidence.

The study further reveals that investors generally perceive robo-advisors as user-friendly, cost-effective, and suitable for first-time investors. These perceptions reflect the core value proposition of robo-advisory: affordability, accessibility, and convenience. The mean score for affordability (4.3 on a five-point scale) suggests that investors recognize robo-advisors as a lower-cost alternative to traditional human advisors, which is consistent with Xu and Zhang's (2023) claim that robo-advisors democratize financial advice. Similarly, high ratings for ease of use and suitability for beginners indicate that robo-advisors effectively meet the needs of novice investors who seek a simple, guided approach to investing.

However, investors express moderate trust in robo-advisors, with a mean score of 3.7, revealing that while they appreciate the convenience, they remain cautious about fully delegating investment decisions to an algorithm. Trust plays a pivotal role in financial decision-making, and any perception of opacity or vulnerability can hinder adoption. The literature frequently cites transparency as a weakness of robo-advisory platforms (BETTER FINANCE, 2022), and the findings here reinforce that conclusion. If investors cannot see clear, comprehensible reports of portfolio performance, algorithmic decision rules, and risk metrics, they may hesitate to commit funds. Fintech companies can address this issue by improving the clarity of disclosures and providing more detailed performance histories.

Perceptions of algorithmic trading reveal an even more cautious stance among retail investors. Although respondents acknowledge that algo trading offers faster execution (mean = 4.2) and has the potential to improve returns through disciplined trading, they view it as too complex for the average investor (mean = 4.0) and risky due to possible system failures (mean = 3.9). This finding aligns with Li's (2021) argument that technical complexity is a barrier to retail adoption of algorithmic trading. The desire to learn algorithmic trading, with a mean score of 3.6 and higher interest among younger investors, indicates that there is potential demand for educational resources that demystify these strategies. Platforms that offer simplified algorithm-building tools, tutorials, and sandbox environments could help bridge this gap and make algo trading more accessible to retail participants.

Statistical analysis further deepens the understanding of these attitudes. The chi-square results demonstrate that awareness of robo-advisory is strongly associated with education level and age, while awareness of algorithmic trading correlates with investment experience and income level. These relationships suggest that education campaigns may need to be tailored to different demographic segments to maximize impact. For example, robo-advisory promotion could focus on university students and young professionals, who are already digitally engaged and likely to experiment with low-cost investment solutions. Algorithmic trading education could target more experienced investors who have the financial capacity and risk appetite to explore complex trading strategies.

Gender differences also emerge as an important factor. T-test results reveal that male investors report significantly higher trust in robo-advisors compared to female investors. This finding is consistent with behavioural finance research indicating that men often exhibit greater risk tolerance and confidence in financial decision-making. To encourage broader participation, fintech platforms may need to address the specific concerns of female investors, possibly by emphasizing security features, providing step-by-step guidance, and creating inclusive communication strategies that build trust.

Correlation analysis confirms that financial knowledge is positively associated with the willingness to use robo-advisory and algorithmic trading. This relationship highlights the critical role of investor education in fintech adoption. Knowledgeable investors are more likely to appreciate the benefits of diversification, cost efficiency, and disciplined rebalancing offered by robo-advisors. They are also better equipped to understand the risks and safeguards involved in algorithmic trading. Educational initiatives that combine theoretical instruction with practical demonstrations can enhance both comprehension and confidence, ultimately driving higher adoption rates.

The logistic regression results provide actionable insights by identifying predictors of robo-advisory adoption intention. Age, financial literacy, digital comfort, and trust in regulation significantly increase the probability of adoption. These findings underscore the importance of a supportive ecosystem that combines user-friendly technology, robust investor protection, and clear regulatory oversight. Regulators like SEBI play a vital role in setting standards for algorithm transparency, data privacy, and dispute resolution, which collectively strengthen investor confidence.

The discussion also highlights the relevance of hybrid advisory models as a bridge between fully automated and traditional human advisory services. Several respondents expressed openness to solutions that combine algorithmic portfolio management with the option to consult a human advisor for major decisions or during market volatility. This preference aligns with Kassler's (2023) research, which finds that hybrid models reduce investor anxiety and encourage adoption. By offering a blend of automation and human interaction, fintech providers can appeal to a wider range of investors, including those who are reluctant to rely exclusively on technology.

From a theoretical perspective, these findings reinforce the Technology Acceptance Model (TAM) and the Unified Theory of Acceptance and Use of Technology (UTAUT). Perceived ease of use, perceived usefulness, and trust emerge as significant determinants of behavioural intention, confirming that adoption decisions are shaped by both functional and psychological factors. The results also align with diffusion of innovation theory, which suggests that early adopters of technology tend to be younger, more educated, and more comfortable with risk. These theoretical frameworks help explain why awareness and adoption are not uniform across demographic groups and provide a basis for designing targeted interventions.

Conclusion

The implications of these findings are substantial for multiple stakeholders. Fintech companies can leverage this research to refine their product offerings, emphasizing transparency, education, and hybrid features to build trust. They can also segment their marketing strategies based on investor profiles, offering more educational content for novice investors and more advanced features for experienced traders. Policymakers and regulators can use the insights to shape frameworks that encourage innovation while safeguarding investor interests. For example, mandatory disclosure requirements, algorithm audits, and investor grievance mechanisms can enhance credibility and reduce perceived risk. Educators and financial literacy advocates can design targeted training modules that improve understanding of automated investing and trading technologies, empowering investors to make informed choices.

Despite its promising findings, the study also highlights persistent barriers that could slow fintech adoption. Concerns about data security, algorithmic bias, and potential system failures remain significant. High-profile incidents of hacking or technical glitches could undermine investor trust and stall adoption momentum. Moreover, overreliance on algorithms without adequate human oversight could expose investors to risks during extreme market events, as seen during global flash crashes triggered by high-frequency trading. Addressing these risks requires a balanced approach that combines technological innovation with regulatory safeguards and investor education.

This research provides an in-depth understanding of how Indian retail investors engage with robo-advisory and algorithmic trading. It confirms that awareness is growing but comprehension and adoption remain limited, shaped by demographic, psychological, and behavioural factors. Investors appreciate the affordability and convenience of robo-advisory but remain cautious due to concerns about trust and control. Algorithmic trading continues to be viewed as complex and risky, yet interest in learning suggests that educational efforts could unlock latent demand. Younger investors, individuals with higher financial literacy, and those who trust regulatory institutions are most likely to adopt these technologies.

This study contributes to academic literature by filling a critical gap in understanding fintech adoption in the Indian context, where cultural attitudes, technological access, and regulatory structures differ from Western markets. It offers practical implications for fintech developers, who can use the findings to design more inclusive and transparent platforms, and for regulators, who can strengthen investor protection frameworks to support responsible innovation. Finally, it underscores the importance of hybrid advisory models and investor education programs as tools for building trust and encouraging adoption.

Overall, robo-advisory and algorithmic trading have the potential to transform investment practices in India by making them more efficient, accessible, and data-driven. Realizing this potential requires coordinated efforts among fintech firms, regulators, and educators to overcome barriers, address knowledge gaps, and cultivate an environment where investors can confidently embrace technological solutions for wealth creation. The study concludes that the future of investing in India will likely feature a symbiotic relationship between human expertise and technological innovation, combining the scalability of algorithms with the reassurance of personal guidance. Such a model can foster inclusive participation, strengthen financial markets, and support long-term economic

Limitations and Future Research

Although this study provides valuable insights into investor awareness, perceptions, and adoption intentions regarding robo-advisory services and algorithmic trading in India, it is not without limitations. Acknowledging these constraints is essential to interpret the findings accurately and to guide future research toward building a more comprehensive understanding of fintech adoption.

One key limitation lies in the reliance on self-reported survey data, which may be subject to biases such as social desirability or overestimation of financial knowledge. Respondents may have overstated their awareness or understanding of robo-advisory and algorithmic trading to appear more informed, leading to potential discrepancies between stated perceptions and actual behaviour. Future research can address this limitation by combining survey data with behavioural tracking, such as monitoring actual usage patterns on investment platforms, to capture a more accurate representation of investor engagement.

Another limitation concerns the sample composition. While the study includes a diverse range of investors across age, gender, and income levels, it remains concentrated among digitally literate and urban respondents. This skew may limit the generalizability of findings to rural or semi-urban populations, where digital adoption rates and financial literacy levels may differ significantly. Future studies should consider employing stratified sampling techniques to ensure broader representation across geographic and socio-economic segments, thereby providing a more holistic view of national fintech adoption trends.

The cross-sectional nature of the research also restricts its ability to capture changes in awareness, perceptions, and adoption over time. Fintech adoption is a dynamic process, influenced by market developments, regulatory changes, and technological innovation. A longitudinal research design could track how investor attitudes evolve in response to new product offerings, increased regulatory oversight, or market events such as periods of volatility.

Snowball approach would provide deeper insights into how sustained exposure to robo-advisory and algorithmic trading affects long-term adoption and trust.

This study also focuses primarily on awareness, perceptions, and intentions, rather than actual financial outcomes. While it identifies predictors of adoption behaviour, it does not measure whether using robo-advisory or algorithmic trading leads to improved portfolio performance, risk-adjusted returns, or investor satisfaction. Future research could adopt an experimental or quasi-experimental design to compare financial outcomes between users and non-users of these technologies, thereby providing evidence of their tangible benefits or drawbacks.

Another limitation is the exclusion of qualitative perspectives. The structured questionnaire captures measurable variables but does not fully explore the nuanced reasons behind investor attitudes, such as emotional drivers, psychological barriers, or past experiences with financial advisors. Qualitative methods, including in-depth interviews or focus groups, could complement quantitative findings and uncover deeper insights into the trust dynamics and behavioural hesitations that shape adoption decisions.

Regulatory context is another area that warrants further exploration. This study acknowledges that trust in regulation positively correlates with adoption, but it does not examine in detail how specific regulatory measures such as algorithm audits, investor grievance redressal systems, or cybersecurity protocols affect investor confidence. Future research could investigate the impact of regulatory interventions on adoption behaviour, perhaps by comparing investor sentiment before and after the implementation of key policy changes.

Lastly, algorithmic trading remains a complex and technical domain, and this study measures only the surface-level awareness and willingness to adopt. Future research could delve deeper into retail investors' capacity to design, test, and implement algorithmic strategies, as well as their need for educational support. Experimental studies offering training interventions could evaluate whether skill-building programs significantly increase adoption and improve trading outcomes.

While this study makes a significant contribution by mapping the current state of fintech adoption in India, future research should expand its scope to include behavioural data, longitudinal designs, outcome-based analyses, qualitative insights, and a broader demographic reach. By addressing these limitations, subsequent studies can generate richer, more actionable knowledge that supports the development of robust, inclusive, and investor-friendly fintech ecosystems.

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