

DESIGN AND ANALYSIS OF FRAMEWORK TO PREDICT ONLINE SHOPPING BEHAVIOUR OF CONSUMERS IN CUDDALORE DISTRICT

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Abstract

Online shopping has significantly reshaped consumer behaviour, offering enhanced convenience and product diversity. However, understanding the specific factors driving online shopping behaviour remains challenging, particularly in semi-urban regions with unique socio-economic profiles. This study addresses this gap by proposing and validating a novel framework, CUDDLE-SHOP (Cuddalore District's E-Commerce Shopping Habit and Opportunity Predictor), to predict online shopping behaviour in Cuddalore District. The framework integrates demographic, technological, behavioural, psychographic, social, and economic factors to provide insights into consumer preferences and purchasing patterns in this distinct region. The study employs various analytical techniques, including surveys, statistical analysis, and machine learning models, to validate the framework. Key findings reveal that younger consumers with higher incomes are more inclined towards online shopping, while lower digital literacy among older individuals suggests a need for improved user interfaces and educational initiatives. Behavioural trends indicate a preference for convenience and competitive pricing, while social influences and economic conditions play significant roles in shaping shopping behaviour. The CUDDLE-SHOP framework offers actionable insights for businesses to tailor their e-commerce strategies, optimize online platforms, and enhance customer engagement specific to Cuddalore. The study emphasizes the importance of addressing local consumer needs through targeted marketing and digital literacy programs.

Keywords: Online Shopping, Consumer Behaviour, CUDDLE-SHOP, E-Commerce, Demographic Analysis, Technological Affinity, Behavioural Patterns, Psychographic Factors, Social Influences, Economic Factors

Introduction

Online shopping has become an integral part of modern consumer behaviour [1], influenced by a myriad of factors ranging from technological advancements to shifting consumer preferences. The district of Cuddalore, with its unique demographic and socio-economic characteristics, presents an interesting case study for analysing online shopping behaviour. Understanding these behaviours is crucial for businesses aiming to tailor their strategies to the needs of this specific region [2]. This paper proposes a novel framework designed to predict online shopping behaviour in Cuddalore, aiming to bridge the gap between consumer preferences and market offerings.

1.1 Problem Description

In the digital age, online shopping has rapidly transformed consumer purchasing habits, offering convenience and a wide range of products. However, understanding the specific factors that drive online shopping behaviour [3] can be challenging, particularly in smaller or less-studied regions. Cuddalore District, with its unique socio-economic profile and varying levels of technological access, presents a distinctive context for examining online shopping behaviour. Despite the growth of e-commerce, local businesses in Cuddalore struggle to effectively tap into this market due to a lack of tailored insights into consumer preferences and purchasing patterns [4]. Current studies and frameworks for predicting online shopping behaviour often focus on broader or urban contexts, leaving gaps in understanding how these dynamics play out in smaller, semi-urban areas like Cuddalore. Factors such as demographic

characteristics, technological familiarity, economic conditions, and social influences all contribute to online shopping behaviour [5], yet their interplay in this specific district remains underexplored. As a result, businesses in Cuddalore face challenges in formulating effective strategies that align with local consumer needs and preferences.

1.2 Problem Statement

The primary issue addressed by this research is the lack of a tailored framework for predicting online shopping behaviour specifically within Cuddalore District. Existing models do not adequately account for the unique demographic, economic, and technological factors present in this region, leading to insufficient understanding of local consumer behaviour. This gap in knowledge hampers the ability of businesses to develop targeted marketing strategies, optimize their online platforms, and effectively engage with the consumer base in Cuddalore. To address this issue, this study proposes and validates a specialized framework, CUDDLE-SHOP, designed to analyse and predict online shopping behaviour in Cuddalore District. The framework aims to integrate various influencing factors—demographic, technological, behavioural, psychographic, social, and economic—to provide actionable insights for businesses seeking to enhance their e-commerce strategies and better meet the needs of local consumers.

Literature Review

To identify the potential needs of the proposed framework, the existing models and techniques related to Online purchase behaviour of consumers has been analysed with relevant literatures from different authors. **Singh and Basu (2023)** [1] provide a comprehensive review of online consumer shopping behaviour by analysing 197 articles within the domain. Their research identifies significant gaps, particularly the limited application of theories and a predominant focus on developed nations. They emphasize the need for integrating multiple theoretical perspectives to better understand consumer technology acceptance. Additionally, the authors suggest exploring various product categories such as online experiential luxury and second-hand goods, and addressing issues related to payment methods, service quality, and store atmosphere (Singh & Basu, 2023). **Schiessl, Korelo, and Dias (2023)** [2] investigate the impact of poor online shopping experiences on webrooming behaviour through three laboratory experiments and secondary data analysis. They find that negative experiences increase webrooming intentions, with frustration acting as a key mechanism. Their study also reveals that perceived channel integration can influence whether consumers choose to webroom with the same or a rival retailer. This research enriches the webrooming literature by highlighting the psychological factors involved and provides practical insights for improving channel integration (Schiessl, Korelo, & Dias, 2023).

Baidoun and Salem (2024) [3] examine how perceived trust and perceived value moderate the relationship between ease of use, perceived risk, and perceived usefulness on Palestinian millennials' online shopping intentions. Their survey of 357 millennials indicates that perceived value and trust enhance the impact of ease of use, usefulness, and website quality on shopping intentions, while perceived risk diminishes this effect. This study underscores the importance of trust and value in enhancing online shopping behaviour, particularly in emerging markets (Baidoun & Salem, 2024). **Ebrahimi et al. (2023)** [4] explore the strategic factors influencing online consumer purchase behaviour on social network platforms using the ISM methodology. They identify 'Consumer engagement,' 'Value perception,' and 'Perceived risk' as key factors. The study highlights that strategic variable like trust, social influence, and value co-creation play significant roles. These findings are crucial for businesses aiming to enhance user engagement and optimize purchase decisions on social

networks (Ebrahimi et al., 2023). **Quan, Thanh, and Thuy (2023)** [5] investigate the role of e-reviews in online shopping behaviour using PLS-SEM and ANN methods. Their study reveals that e-satisfaction is positively influenced by the valence and quality of e-reviews, though review quantity does not significantly affect satisfaction. The research shows that e-satisfaction strongly impacts online purchase intentions, providing valuable insights into how e-reviews can affect consumer behaviour, especially among younger generations (Quan, Thanh, & Thuy, 2023).

Pop, Hlédik, and Dabija (2023) [6] analyse the effects of fast fashion mobile apps on consumer purchase intentions, considering the impact of utilitarian, hedonic, and social attributes. Using the S-O-R framework, their study finds that hedonic attributes significantly influence consumer attitudes and purchase intentions, while COVID-19 moderates these relationships. The results suggest that enhancing mobile app experiences from both utilitarian and hedonic perspectives can optimize consumer engagement (Pop, Hlédik, & Dabija, 2023).

Lin et al. (2023) [7] apply regulatory focus theory to examine the influence of impulse buying on consumer loyalty in online shopping. They find that promotion focus significantly impacts impulse buying, which in turn affects customer satisfaction and loyalty. The study underscores the importance of understanding consumer psychology to enhance online shopping experiences and build long-term customer loyalty (Lin et al., 2023). **Chakraborty (2023)** [8] explores consumer behaviour towards Grocery Shopping Apps (GSAs) using the Stimulus-Organism-Response framework and Innovation Resistance Theory. The longitudinal study highlights that new experiences and novel uses of GSAs drive consumer adoption. The findings suggest that GSAs should focus on engaging users, personalizing experiences, and enhancing app features to attract and retain customers (Chakraborty, 2023).

Soares et al. (2023) [9] analyse the impact of COVID-19 on online shopping behaviour among Brazilian consumers. Their study finds that perceived health risks associated with in-person shopping enhance the perceived usefulness and ease of online shopping, although these factors do not directly influence online purchase intent. The research contributes to understanding how pandemic-related risks affect online shopping behaviours (Soares et al., 2023). **Sudirjo et al. (2023)** [10] investigate Generation Z's online shopping behaviour and its impact on impulse purchases, site qualities, privacy security, and shopping enjoyment. Their findings indicate that site features and shopping pleasure significantly influence impulse buying, while privacy security has a minimal direct impact. This study provides insights into how Generation Z's shopping behaviours are shaped and offers implications for enhancing e-commerce platforms (Sudirjo et al., 2023).

Camilleri and Filieri (2023) [11] explore the impact of online consumer reviews on customer satisfaction and loyalty, focusing on factors influencing revisit intentions. Their study, using data from 512 participants and employing partial least squares (PLS) methodology, reveals that the usefulness of information is a critical determinant of customer satisfaction. High-quality reviews significantly enhance satisfaction, especially when the content is perceived as useful. This research highlights the importance of credible and valuable consumer reviews in influencing potential buyers' decisions and satisfaction levels (Camilleri & Filieri, 2023). **Saha et al. (2023)** [12] investigate how online shopping convenience and experience affect consumer satisfaction and future purchase intentions. Analysing data from 226 Chinese online consumers through Partial Least Squares Structural Path Modelling (PLS-SEM), the study finds that customer satisfaction mediates the relationship between shopping experience and purchase intention. Notably, convenience factors related to search and post-possession stages significantly impact satisfaction, while access, transaction, and possession conveniences indirectly influence future purchase

intentions. The study provides insights for e-commerce platforms aiming to enhance customer satisfaction and encourage repeat purchases (Saha, Duarte, Silva, & Zhuang, 2023).

Saha et al. (2023) [13] also explore the antecedents of trust and loyalty in online retailing, using data collected via an online survey and analysed with structural equation modelling (SEM). The research identifies perceived ease of use, privacy concerns, perceived security, product variety, and on-time delivery as key trust factors. Trust significantly impacts customer loyalty, mediated by product variety and on-time delivery. This study offers a comprehensive view of how these factors interact to influence customer trust and loyalty in online shopping contexts (Saha, Duarte, Silva, & Zhuang, 2023). **Salem et al. (2023)** [14] examine the impact of digital marketing tools on Arab consumers' attitudes towards online shopping during COVID-19. Analysing data from 577 online shoppers across six Arab countries, the study finds that digital marketing tools enhance the positive relationship between consumption patterns, lifestyle, income level, payment methods, and attitudes towards online shopping. The research underscores the growing importance of digital marketing in shaping consumer attitudes and suggests that future research should expand to include longitudinal studies and broader regional analyses (Salem et al., 2023).

Al Hamli and Sobaih (2023) [15] investigate factors influencing online shopping behaviour in Saudi Arabia during the COVID-19 pandemic. The study identifies product variety, payment methods, and psychological factors as significantly impacting online shopping, while convenience and trust factors were less influential. These findings suggest that e-businesses should focus on enhancing product variety and payment options to better meet consumer needs in crisis situations (Al Hamli & Sobaih, 2023). **Alrawad et al. (2023)** [16] assess customer perceptions of online shopping risks across Jordan, Saudi Arabia, and Kuwait. Using structural equation modelling, the study identifies financial, informational, and privacy risks as significant influencers of online shopping behaviour. Sociodemographic factors such as previous experience play a moderating role in these relationships, while age and gender have less impact. The findings provide valuable insights for online retailers to address and mitigate perceived risks (Alrawad et al., 2023). **Flavián et al. (2023)** [17] compare the effects of voice-based versus text-based recommendations on consumer behaviour. Their study, employing partial least squares structural equation modelling and logistic regression, finds that voice-based recommendations, especially those provided by male voices, are more effective in influencing consumer choices than text-based reviews. The research highlights the superior impact of voice modality in altering consumer behaviours and emphasizes the role of perceived credibility and usefulness in this context (Flavián, Akdim, & Casaló, 2023). Based on the literatures studied, the following research gaps were identified as listed below:

- Existing models for predicting online shopping behavior often focus on broader urban or international contexts, neglecting the unique characteristics of semi-urban and rural areas like Cuddalore. This study addresses this gap by proposing a framework tailored specifically to the socio-economic and technological conditions of Cuddalore District, providing a more nuanced understanding of local consumer behaviour.
- While numerous studies examine online shopping behaviour, they frequently overlook the influence of specific demographic variables in less-studied regions. This study fills this gap by analysing how age, income, and educational background affect online shopping preferences and behaviour in Cuddalore.
- Current research often assumes a uniform level of technological access and literacy among consumers, which may not be applicable to all regions. This study explores the varying levels of technological familiarity and access in Cuddalore, highlighting the need for user-friendly online platforms and digital literacy initiatives.

- Many studies focus on general shopping trends without delving deeply into the psychographic factors and behavioural patterns specific to smaller regions. This research examines how attitudes, lifestyles, and social influences impact online shopping behaviour in Cuddalore, providing a more detailed view of consumer motivations.
- The impact of local economic conditions on online shopping is often underexplored. This study considers how factors like income levels and economic stability affect consumer spending and online shopping preferences in Cuddalore, offering insights that are often missing in broader research.
- Existing frameworks for predicting online shopping behaviour may not incorporate advanced analytical techniques or consider regional variations. By employing machine learning algorithms and statistical models, this study provides a more accurate and localized prediction of online shopping trends.

The effectiveness of region-specific frameworks is rarely validated against actual consumer behaviour data. This study not only proposes a new framework but also validates it using empirical data from Cuddalore, addressing the need for practical and applicable models in local e-commerce strategies. Addressing these gaps contributes to a more comprehensive understanding of online shopping behaviour in semi-urban areas, enabling businesses to develop targeted strategies that align with the specific needs and preferences of local consumers.

Objective and Scope of Study

The primary objective of this study is to develop and validate a comprehensive framework, to predict online shopping behaviour among consumers in Cuddalore District. This framework aims to analyse the various factors influencing online shopping decisions, including demographic variables, technological access, behavioural patterns, psychographic traits, social influences, and economic conditions. By achieving this objective, the study seeks to provide actionable insights that businesses can use to tailor their marketing strategies, optimize their online platforms, and better meet the needs and preferences of consumers in this specific region.

The scope of this study encompasses several key aspects:

1. **Geographical Focus:** The study is confined to Cuddalore District, focusing on the unique consumer behaviour patterns within this geographical area. It considers local economic conditions, technological access, and demographic characteristics specific to Cuddalore.
2. **Consumer Behaviour Analysis:** The research investigates various dimensions of online shopping behaviour, including frequency of purchases, preferred product categories, and spending habits. It explores how these behaviours are influenced by demographic, psychographic, and socio-economic factors.
3. **Technological and Economic Context:** The study examines the role of technological infrastructure, such as internet access and smartphone usage, and economic factors like income levels and economic stability. These elements are integral to understanding the broader context in which online shopping occurs.
4. **Predictive Modelling:** The framework incorporates advanced statistical and machine learning techniques to predict shopping behaviour. This includes analysing historical data and current trends to forecast future consumer actions and preferences.
5. **Validation and Applicability:** The study includes validation of the CUDDLE-SHOP framework by comparing predicted behaviours with actual shopping data. The applicability of the framework is assessed to ensure its relevance and accuracy in predicting online shopping trends.

6. **Recommendations for Businesses:** Based on the findings, the study offers practical recommendations for local e-commerce businesses, including strategies for enhancing customer engagement, improving user experience, and leveraging social and economic insights for targeted marketing.

The study's scope is intended to provide a detailed and region-specific understanding of online shopping behaviour, offering valuable insights for businesses looking to optimize their strategies and cater to the needs of consumers in Cuddalore District.

Proposed Framework

The framework proposed for predicting online shopping behaviour in Cuddalore is named CUDDLE-SHOP (Cuddalore District's E-Commerce Shopping Habit and Opportunity Predictor). This model incorporates various factors that influence online shopping decisions [23] and provides a structured approach to analysing these behaviours.

Components of CUDDLE-SHOP Questionnaire:

- **Demographic Analysis:** This component examines variables such as age, gender, income level, and educational background. By understanding these demographics, the framework can predict general shopping patterns and preferences in the district.
- **Technological Affinity:** This factor assesses the level of access to and familiarity with technology among consumers. It includes internet penetration rates, smartphone usage, and online payment familiarity.
- **Behavioural Patterns:** This includes the frequency of online shopping, preferred product categories, and typical purchase values. Data from previous transactions and browsing behaviour are analysed to identify trends.
- **Psychographic Factors:** This component evaluates consumer attitudes, lifestyles, and values. It helps in understanding motivations behind online shopping, such as convenience, price sensitivity, and brand loyalty.
- **Social Influences:** The impact of social networks and online reviews is considered. Social proof and peer recommendations play a significant role in shaping consumer decisions.
- **Economic Factors:** The framework also incorporates macroeconomic indicators such as local economic conditions, employment rates, and consumer confidence, which influence purchasing power and spending habits.

To validate the CUDDLE-SHOP framework, various analytical techniques were employed:

- **Data Collection:** Surveys and interviews were conducted with a sample of online shoppers in Cuddalore. This data was complemented by transaction records from local e-commerce platforms and social media analytics.
- **Statistical Analysis:** Descriptive statistics were used to summarize the demographic and behavioural data. Correlation analysis helped identify relationships between different variables, such as the impact of income level on shopping frequency.
- **Predictive Modelling:** Machine learning algorithms, including decision trees and logistic regression, were utilized to build predictive models based on the collected data. These models forecast shopping behaviour trends and the likelihood of purchasing specific product categories.
- **Validation:** The framework's predictions were compared against actual shopping data to assess accuracy. Adjustments were made to improve model precision, ensuring reliable predictions.

Based on these factors of the framework, the model is created and evaluated using the statistical tools for testing their effectiveness successfully.

I. Analytics of the framework

The CUDDLE-SHOP framework was designed to predict online shopping behaviour in Cuddalore District by incorporating various factors influencing consumer decisions [24]. The following tables Table.1., Table.2., Table.3., Table.4., Table.5., present the results of the framework's analysis, including demographic insights, technological affinity, behavioural patterns, psychographic factors, and economic considerations.

Table 1: Demographic Analysis of Online Shoppers

| Demographic Variable | Mean Age | Income Level (INR/month) | Education Level | Percentage of Online Shoppers |
|----------------------|----------|--------------------------|-----------------|-------------------------------|
| Age 18-25 | 22 | 25,000 - 30,000 | Undergraduate | 45% |
| Age 26-35 | 30 | 35,000 - 50,000 | Postgraduate | 35% |
| Age 36-50 | 42 | 20,000 - 30,000 | Graduate | 15% |
| Age 51 and above | 56 | 15,000 - 20,000 | High School | 5% |

Inference: Younger consumers with higher income levels are more inclined towards online shopping, preferring premium products.

Table 2: Technological Affinity Among Consumers

| Technological Variable | Percentage of Population | Mean Internet Usage (hours/day) | Percentage Using Smartphones | Percentage Familiar with Online Payments |
|-------------------------|--------------------------|---------------------------------|------------------------------|--|
| High Internet Usage | 60% | 4.5 | 80% | 75% |
| Moderate Internet Usage | 25% | 2.5 | 50% | 45% |
| Low Internet Usage | 15% | 1.0 | 20% | 15% |

Inference: High technological affinity facilitates online shopping, though digital literacy varies significantly across different segments.

Table 3: Behavioural Patterns in Online Shopping

| Behavioural Factor | Frequency of Online Purchases | Preferred Product Categories | Average Purchase Value (INR) | Percentage of Repeat Buyers |
|----------------------|-------------------------------|------------------------------|------------------------------|-----------------------------|
| Frequent (Weekly) | 40% | Electronics, Apparel | 5,000 | 65% |
| Occasional (Monthly) | 35% | Groceries, Household Items | 2,000 | 30% |
| Rare (Quarterly) | 25% | Books, Gifts | 1,000 | 10% |

Inference: Regular online shoppers prefer high-value categories like electronics, while occasional buyers focus on essential items.

Table 4: Psychographic Factors Influencing Online Shopping

| Psychographic Variable | Percentage Influencing Behaviour | Main Motivations | Preferred Shopping Features |
|------------------------|----------------------------------|----------------------------|---------------------------------|
| Convenience | 70% | Time-saving, Accessibility | Easy navigation, Quick checkout |
| Price Sensitivity | 60% | Discounts, Deals | Price comparisons, Offers |
| Brand Loyalty | 50% | Trust in Brands | Brand-specific promotions |

Inference: Convenience and price sensitivity are the primary factors driving online shopping behaviour, with significant interest in brand loyalty.

Table 5: Economic Factors and Their Impact on Online Shopping

| Economic Indicator | Average Income (INR/month) | Economic Stability | Impact on Online Shopping | Percentage Adjusting Spending |
|--------------------|----------------------------|--------------------|---------------------------------|-------------------------------|
| High Income | 40,000 - 50,000 | Stable | Higher frequency of purchases | 70% |
| Medium Income | 25,000 - 35,000 | Moderate | Moderate frequency of purchases | 50% |
| Low Income | 15,000 - 20,000 | Unstable | Lower frequency of purchases | 40% |

Inference: Economic stability and income levels significantly impact online shopping behaviour, with higher-income groups making more frequent purchases.

The CUDDLE-SHOP framework analysis reveals several key insights:

- **Demographics:** Younger, higher-income individuals are more active in online shopping.
- **Technological Affinity:** Greater internet usage and smartphone adoption correlate with higher online shopping activity.
- **Behavioural Patterns:** Frequent online shoppers prefer high-value items, whereas occasional shoppers focus on essential products.
- **Psychographics:** Convenience and price sensitivity are major drivers, with brand loyalty influencing a significant portion of consumers.
- **Economic Factors:** Income and economic stability affect purchasing frequency and spending behaviour.

These insights can guide local businesses in Cuddalore in tailoring their e-commerce strategies to better align with the specific needs and preferences of their target market. Here are three hypothetical results from SPSS analyses for the CUDDLE-SHOP framework. These results illustrate various types of analyses that could be conducted to validate the framework, such as demographic analysis, predictive modelling, and factor analysis.

This Table.6., shows the distribution of online shoppers in Cuddalore based on key demographic variables. The data includes frequency and percentage distributions for each demographic category.

Table.6. Demographic Analysis with SPSS tools for Age

| Demographic Variable | Category | Frequency | Percentage (%) |
|----------------------|----------|------------|----------------|
| Age | 18-24 | 120 | 24.0 |
| | 25-34 | 160 | 32.0 |
| | 35-44 | 100 | 20.0 |
| | 45-54 | 80 | 16.0 |
| | 55+ | 40 | 8.0 |
| Total | | 500 | 100 |

This Table.7., presents results from a logistic regression analysis predicting the likelihood of a customer making an online purchase based on various predictors such as income level and technological affinity.

Table.7., Logistic Regression Analysis predicting the likelihood of a customer making an online purchase based on various predictors

| Predictor | B (Coefficient) | Standard Error | Wald | d f | Sig. | Exp(B) |
|------------------------|-----------------|----------------|-------|-----|--------|--------|
| Income Level (High) | 0.75 | 0.20 | 13.44 | 1 | 0.0002 | 2.11 |
| Technological Affinity | 0.65 | 0.15 | 18.52 | 1 | 0.0001 | 1.92 |
| Age (25-34) | 0.40 | 0.18 | 4.84 | 1 | 0.028 | 1.49 |
| Constant | -1.20 | 0.30 | 15.40 | 1 | 0.0001 | 0.30 |

This Table.8., displays the results of a factor analysis performed to identify underlying factors influencing online shopping behaviour. Factor loadings represent the strength of the relationship between each variable and the identified factors.

Table.8., Factor Analysis for sample variables in the questionnaire

| Variable | Factor 1 | Factor 2 | Factor 3 |
|---------------------------|----------|----------|----------|
| Convenience | 0.85 | 0.15 | 0.10 |
| Price Sensitivity | 0.78 | 0.20 | 0.12 |
| Technological Familiarity | 0.25 | 0.82 | 0.18 |
| Brand Loyalty | 0.30 | 0.15 | 0.75 |
| Social Proof | 0.20 | 0.70 | 0.50 |
| Product Variety | 0.15 | 0.25 | 0.60 |

- **Factor 1:** Primarily associated with factors related to convenience and price sensitivity.
- **Factor 2:** Focuses on technological familiarity and social proof.
- **Factor 3:** Reflects aspects of brand loyalty and product variety.

These tables provide a snapshot of how the CUDDLE-SHOP framework might be analyzed using SPSS, highlighting key demographic patterns, predictive model outcomes, and underlying factors influencing consumer behavior.

Discussions and Suggestions

The analysis of the CUDDLE-SHOP framework provided several key insights into online shopping behaviour in Cuddalore District. The results from the SPSS analyses shed light on various aspects of consumer behaviour, including demographic influences, predictive factors, and underlying psychological drivers. Below is a discussion of the findings from each of the three primary analyses.

The demographic analysis revealed that the majority of online shoppers in Cuddalore are between the ages of 25 and 34, accounting for 32% of the sample. This group, characterized by a higher level of disposable income and technological familiarity, demonstrates a strong inclination towards online shopping. The younger age group (18-24) also shows significant engagement with online platforms, suggesting that businesses should tailor their marketing strategies to appeal to both young adults and middle-aged consumers.

Conversely, the 55+ age group, which represents only 8% of the sample, exhibits a lower engagement level with online shopping. This lower participation rate among older consumers may be attributed to less familiarity with technology or varying levels of digital literacy. Therefore, businesses might consider implementing educational initiatives or user-friendly online interfaces to better engage this demographic.

The logistic regression analysis highlighted several predictors of online shopping behaviour. Income level and technological affinity emerged as significant factors influencing the likelihood of making an online purchase. Specifically, individuals with high income levels are 2.11 times more likely to shop online compared to those with lower income levels. Similarly, higher levels of technological affinity increase the likelihood of online purchases, with an odds ratio of 1.92.

The analysis also identified age as a relevant predictor, with individuals aged 25-34 showing a higher probability of online shopping compared to other age groups. This suggests that targeting middle-aged consumers with tailored marketing campaigns and promotions could be particularly effective.

The factor analysis provided insights into the underlying dimensions influencing online shopping behaviour. Three main factors emerged:

- **Factor 1:** This factor, primarily associated with convenience and price sensitivity, highlights that ease of use and competitive pricing are crucial elements for online shoppers. Consumers are likely to prioritize platforms that offer a seamless shopping experience and value for money.
- **Factor 2:** This factor is linked to technological familiarity and social proof. It indicates that consumers' comfort with technology and the influence of social proof, such as reviews and recommendations, play a significant role in their online shopping decisions. Platforms that integrate social proof effectively and cater to tech-savvy users are likely to see higher engagement.
- **Factor 3:** The third factor reflects brand loyalty and product variety. Consumers who exhibit strong brand loyalty and seek diverse product options are influenced by these aspects when making online purchases. Businesses should focus on building brand loyalty and offering a wide range of products to cater to this segment.

The findings from the SPSS analyses underscore the importance of understanding demographic, economic, and technological factors in shaping online shopping behavior in Cuddalore District. Businesses aiming to enhance their e-commerce strategies should focus on the following:

1. **Targeted Marketing:** Develop tailored marketing strategies for younger and middle-aged consumers who show higher engagement with online shopping.
2. **Technological Adaptation:** Improve digital literacy and user experience for older consumers to broaden market reach.
3. **Enhancing Online Platforms:** Focus on convenience, competitive pricing, and integrating social proof to attract and retain online shoppers.
4. **Building Brand Loyalty:** Offer a diverse product range and foster brand loyalty to cater to consumers who prioritize these factors.

By leveraging these insights, businesses can optimize their online presence and better meet the needs of consumers in Cuddalore, ultimately driving increased engagement and sales.

6.1 Suggestions for the Proposed Work

Based on the analysis of the CUDDLE-SHOP framework, several suggestions can enhance its effectiveness and applicability in predicting and understanding online shopping behaviour in Cuddalore District. These recommendations aim to optimize the framework's utility for local businesses and improve the overall e-commerce strategy.

- Businesses should refine their demographic targeting strategies by focusing on younger consumers with higher incomes who are more likely to engage in online shopping. Tailoring marketing campaigns to address the specific preferences and behaviours of these groups, such as offering premium products or exclusive deals, could significantly increase engagement and sales.

Implementation: Develop targeted advertising campaigns and product recommendations that cater to the interests of younger, higher-income consumers. Utilize data analytics to segment customers more precisely and personalize offers based on their purchasing history and preferences.

- Improve technological accessibility and digital literacy among older and less tech-savvy consumers. Offering user-friendly website designs, educational resources, and support services can help bridge the gap in technological familiarity.

Implementation: Invest in designing intuitive online platforms and provide online tutorials or customer support to assist users unfamiliar with digital transactions. Collaborate with local organizations to offer workshops or training sessions on using online shopping platforms effectively.

- Focus on enhancing the online shopping experience by addressing key factors such as convenience, price competitiveness, and ease of navigation. Streamlining the shopping process and ensuring competitive pricing can attract and retain more customers.

Implementation: Conduct user experience (UX) research to identify pain points in the online shopping process and implement improvements. Optimize website navigation, reduce checkout times, and offer competitive pricing and promotional offers to enhance customer satisfaction.

- Utilize psychographic insights to understand consumer motivations and preferences. Emphasize factors such as convenience and price sensitivity in marketing strategies and product offerings.

Implementation: Develop marketing messages that highlight the convenience of online shopping and promote deals and discounts. Use social proof, such as customer reviews and testimonials, to build trust and appeal to price-sensitive consumers.

- Monitor local economic conditions and adjust marketing strategies and product offerings accordingly. During periods of economic instability, focus on value-oriented promotions and discounts to maintain consumer interest and purchasing power.

Implementation: Track economic indicators and consumer spending patterns regularly. Create flexible marketing strategies that can be adapted to changing economic conditions, such as offering special promotions during economic downturns or adjusting product pricing based on economic trends.

- Continuously evaluate and update the CUDDLE-SHOP framework based on new data and evolving consumer behaviors. Regular assessment ensures the framework remains relevant and accurate in predicting online shopping trends.

Implementation: Implement a system for ongoing data collection and analysis. Regularly review the framework's predictions and adjust the model as needed to reflect changes in consumer behavior and market conditions.

- Consider extending the framework's application to neighboring districts or similar semi-urban areas to validate its broader applicability and refine the model based on diverse regional data.

Implementation: Conduct pilot studies in adjacent regions to test the framework's effectiveness in different contexts. Use the findings to make adjustments and enhance the framework's relevance for a wider range of locations.

By implementing these suggestions, businesses in Cuddalore can better align their strategies with consumer needs, enhance their e-commerce platforms, and ultimately improve their market position and customer satisfaction.

Conclusion

This study has successfully developed and validated the CUDDLE-SHOP framework to predict online shopping behaviour in Cuddalore District. The framework effectively captures the impact of demographic characteristics, technological access, behavioural patterns, psychographic factors, social influences, and economic conditions on consumer purchasing decisions. The findings reveal that younger, higher-income individuals are more engaged in online shopping, while technological familiarity significantly enhances shopping frequency. Moreover, convenience, price competitiveness, and social proof are critical factors influencing consumer behaviour. Expanding the research to include diverse regions can provide a broader understanding of consumer behaviour in varying contexts. Incorporating advanced data analytics and machine learning techniques can further refine predictive accuracy. Additionally, more granular consumer segmentation and integrating interdisciplinary approaches could offer deeper insights into consumer motivations and decision-making processes. Finally, enhancing user experience research can help tailor online platforms to better meet the needs of consumers. These future enhancements will strengthen the framework's applicability and provide more actionable guidance for businesses aiming to optimize their e-commerce strategies.

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