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DETERMINANTS OF CUSTOMER LOYALTY IN THE GHANAIAN E-COMMERCE: A PLS-SEM APPROACH

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ABSTRACT

This study explores how customer service quality affects e-satisfaction and e-trust, impacting e-loyalty in Ghana's e-commerce, focusing on Jumia. It also examines how mobile application design and promotions influence e-satisfaction, e-trust, and potential e-loyalty in the Ghanaian market. This study assessed the hypotheses in the established research model using structural equation modeling based on data collected from 320 participants from Ghanaian online shoppers. The survey targeted individuals aged 18-60 of both genders who have completed multiple online transactions on the specified e-commerce platform. The study's results unequivocally affirm the pivotal role of customer satisfaction as a driving force behind customer loyalty. Various factors, including the quality of customer service, the effectiveness of marketing promotions, and the user-friendly design of mobile applications, mold customer satisfaction. These results offer valuable insights for e-commerce businesses in Ghana, emphasizing the importance of customer service quality and mobile app design to enhance customer satisfaction, trust, and loyalty. Further research could explore these relationships in greater depth and consider additional variables to gain a more comprehensive understanding.

KEYWORDS: E-commerce, Customer service quality, Marketing Promotion, E- Satisfaction, E-Trust, E-Loyalty

INTRODUCTION

Ghana's Electronic (E)-commerce market is described as substantial and experiencing rapid growth. In the year 2018, approximately 30 million Ghanaians conducted their transactions through e-commerce, resulting in a transaction value of at least \$8 billion, with projections indicating an increase to \$40 billion over the subsequent five years (Badran, 2021; Nyarko et al., 2022). Compared to the total retail sales in Ghana, e-commerce transactions represent a relatively small portion, accounting for only 3% (Goga et al., 2019).

However, the e-commerce sector is anticipated to exhibit robust double-digit growth, as evidenced by the trends from 2017 to 2019. Ghanaian e-commerce revenue experienced a notable 65% increase (Sarfo & Song, 2021). As defined by (Chaffey et al., 2019), E-commerce encompasses all electronically mediated information exchanges between an organization and its external stakeholders. To further foster this growth, there is an expectation that e-commerce platforms will emphasize the development of mobile applications to facilitate a transition among retailers, with a focus on ensuring data security. This shift is driven by mobile applications offering greater user-friendliness than websites (Lin et al., 2021). In 2018, the Ghanaian e-commerce market featured 4.5 million active sellers, with 99% classified as microenterprises, while the remaining 1% constituted significant players in the market (Kilay et al., 2022). Given the abundance of product and service options available to customers, maintaining customer loyalty becomes pivotal, as customer loyalty plays a crucial role in staying competitive.

Predictions regarding the growth of the e-commerce sector in Ghana have been significantly affected by the COVID-19 pandemic. Forecasts made in 2019 and earlier have failed to materialize. In 2020, a substantial 85.83% of e-commerce businesses experienced a decline in revenue due to an 85.1% reduction in transaction volume (Yulivan & Anriani, 2022). Concurrently, Boudet et al. (2020) research revealed that the pandemic has challenged customer loyalty. Approximately 77% of consumers in the United States explored new websites, channels, and stores, a trend also observed in consumer surveys globally. This shift in consumer behavior is facilitated by the ease of trying out new online shopping experiences and comparing available e-commerce platforms, all of which can be done with minimal effort on their part. Consequently, consumers can seek the best value offers, while e-commerce providers face the pressing task of retaining and nurturing customer loyalty.

E-commerce platforms offer customers a plethora of choices when it comes to products and services. The success of e-commerce is driven by factors such as product and service information, convenience, security, ease of use, and the reputation of the websites (Abdullah et al., 2020). Additionally, Al-Adwan and Al-Horani (2019) found that security and privacy, as well as web design, positively influence online customer satisfaction (e-satisfaction) and loyalty (e-loyalty). Previous studies in developed countries have emphasized the significance of e-satisfaction, e-commitment, and e-trust in shaping e-loyalty (Goutam et al., 2021). This research indicates that e-service quality and perceived value derived from e-commerce significantly impact customer satisfaction, e-trust, e-commitment, and loyalty. Critical factors in e-service quality include efficiency, system availability, fulfillment, and privacy. This study aligns with recent research conducted in the Ghanaian market, which found that service quality and perceived value significantly affect customer satisfaction, with both variables indirectly influencing loyalty through satisfaction (Attakora-Amaniampong et al., 2021; Wardani & Hendrati, 2020). A study by Al-Adwan and Al-Horani (2019) examined various factors influencing e-

loyalty, including social commerce components, fulfillment/reliability, security/privacy, customer service, and web design. The results demonstrate that e-loyalty is positively influenced by e-satisfaction and e-trust. Furthermore, a study by Jumia Mwaura (2021) highlighted the positive impact of website design quality on customer trust, suggesting that a well-designed e-commerce website may lead to repeat purchases over time.

Another study by Yang and Yuan (2018) explored the influence of B2C interaction on customer loyalty, indicating that factors like fulfillment, mobility, community, and personalization in B2C interactive solutions can directly and significantly enhance customer loyalty. Additionally, Akıl and Urgan (2022) found that service quality is crucial to e-commerce satisfaction and loyalty. Consistent with Mwaura (2021) regarding Jumia Ghanaian, this study revealed that Jumia's superior service quality provides added value for customers, setting it apart from other e-commerce platforms and fostering loyalty through customer satisfaction and an excellent shopping experience. Croes et al. (2019) proposed separate methods and variables for measuring e-loyalty in e-commerce, including Net Promoter Score (NPS), cross-buying, and retention. Operational variables such as delivery and logistics were identified, with delivery being shown to impact customer loyalty significantly.

Additionally, the marketing mix (product, price, promotion, and location) substantially influenced consumer loyalty. However, the impact of advertisements on customer loyalty yielded mixed results, suggesting the need for further investigation into this aspect. Recent research has consistently highlighted the role of web design as a driver of e-loyalty. Given that 69% of e-commerce transactions in the Ghanaian market occur through mobile applications (Awiagah et al., 2016), exploring the influence of application design on e-loyalty could offer valuable insights. Furthermore, limited previous studies have delved into the impact of customer service quality, mobile application design, and promotions on e-loyalty.

Based on the above discussions, this article aims to address several research questions. First, it seeks to determine the significant impact of customer service quality on e-satisfaction and e-trust and, subsequently, its influence on e-loyalty in the Ghanaian market. Second, building on Mwaura (2021), the study aims to establish how mobile application design significantly impacts e-satisfaction and e-trust, ultimately influencing e-loyalty in the Ghanaian market, focusing on Jumia e-commerce. Lastly, the study investigates how promotions (marketing offers) significantly affect e-satisfaction and e-trust, potentially influencing e-loyalty in the Ghanaian market.

LITERATURE REVIEW AND HYPOTHESIS DEVELOPMENT

This literature review provides a comprehensive overview of the factors influencing e-loyalty in e-commerce, offering insights into the intricate relationships among e-satisfaction, e-trust, service

quality, mobile application design, and promotions. These factors collectively shape e-loyalty, impacting customer behavior and brand loyalty in the digital realm.

E-Loyalty and Its Determinants

E-loyalty, a concept rooted in the digital age, emerges from the customer's sense of satisfaction with a product or service they have encountered (Santoso & Napitupulu, 2018). In the vast landscape of scholarly literature, diverse definitions of loyalty exist, many closely tied to the notion of repeat buying behavior. For instance, Khoa (2023) characterizes loyalty as the customer's willingness to divulge personal information within an e-commerce platform. Beyond these overarching loyalty definitions, several research studies have delved deeper into the construct of e-loyalty.

In contemporary marketing, a central objective is cultivating customer loyalty, which promises to establish long-lasting relationships between organizations and consumers. This is an area of significant interest for researchers (Croes et al., 2019). They have found that loyalty, particularly in e-commerce, is driven by operational variables such as delivery cost, type, timing, and marketing mix factors. These determinants collectively influence the customer's decision to remain committed to a particular brand or product.

E-Satisfaction as a Driver of E-Loyalty

E-satisfaction, a pivotal factor in e-loyalty, encompasses customers' emotional responses following their interaction with a product or service (Sadeghi et al., 2019). Experts have meticulously defined this aspect of the customer experience. According to Qazzafi (2020), satisfaction arises when the performance of a product or service aligns with the customer's initial expectations. Various studies have affirmed the considerable influence of customer satisfaction on e-loyalty. Customers who derive pleasure from interacting with a product or service are more likely to return for repeat purchases (Khadka & Maharjan, 2017).

Nguyen et al. (2020) emphasize the importance of expectations in this context, asserting that they are the primary determinant of customer satisfaction, followed closely by the perception of performance. Consequently, customer satisfaction hinges on aligning what customers expect and what they receive (Chan et al., 2022).

H1: E-Satisfaction has a positive impact on E-Loyalty
E-Trust and Its Impact on E-Loyalty

Trust is a critical factor in online shopping where face-to-face interactions are absent. Confidence, often referred to as "online trust" or "e-trust," plays a fundamental role in the customer's decision-

making process (Broeder, 2020). Previous studies have explored the intricate relationship between e-loyalty and e-trust. For instance, Susanti et al. (2018) have found that both customer trust and satisfaction significantly influence the loyalty of e-commerce customers. Mofokeng (2019) has further examined this relationship and discovered that while satisfaction is not a significant influencer of customer loyalty, there is a strong and significant correlation between trust and loyalty.

H2: E-trust has a positive impact on E-Loyalty
Customer Service Quality and Its Role in E-Loyalty

Customer service quality is a critical factor motivating customers to establish loyalty within E-commerce. Under the investigation conducted by Mulia and Fitriyah (2023) in Jumia e-commerce, it is evident that customer trust positively influences the caliber of E-services. A robust standard of E-service quality within the domain of E-commerce invariably leads to an enhanced level of customer satisfaction and engenders customer trust. This aligns seamlessly with the findings of Sharma and Bahl (2018), indicating the profound impact of service quality on the dynamics of E-commerce. Furthermore, (Mwaura, 2021) posits that the pinnacle of service quality achieved by Jumia contributes additional value to the overall customer experience, setting it apart from other E-commerce platforms. Customers tend to derive satisfaction when Jumia delivers services that outshine competing E-commerce entities.

Consequently, the ongoing trajectory of research involving Jumia anticipates preserving and enhancing the prevailing service quality for consumers. This trajectory underscores that service quality catalyzes nurturing customer trust. It aligns with research outcomes that affirm the positive effect of customer trust on the intention to repurchase. A deep-rooted bond with E-commerce emerges as customers place their trust in the platform, thus emphasizing prioritizing customer trust as a cornerstone for E-commerce entities. Moreover, the hypothesis posits that the constructs of customer trust can mediate the interplay between website design quality and the intention to repurchase. Subsequently, the intention to repurchase evolves into the bedrock for customer loyalty.

E-commerce establishments that offer top-tier service quality derive the advantage of gaining an intricate understanding of customer expectations, thereby elevating the sphere of customer satisfaction (Mwaura, 2021). This underscores the significance of excellent customer service, expedited delivery times, and a seamless shopping experience. These facets collectively motivate customers to harbor repurchase intentions, fostering contentment with their purchase encounters. Therefore, predicated upon the amalgamation of insights gleaned from the studies mentioned earlier, it is unequivocal that the quality of service extended by E-commerce in their interactions with customers substantially influences customer satisfaction. An up-to-date study by Al-Adwan and Al-Horani (2019) reaffirms

that customer service quality robustly bolsters customer satisfaction, consequently engendering loyalty.

In a concluding vein, another research effort by Juliana et al. (2021) indicates the pivotal role of customer service in shaping customer trust. This encompasses post-sale support, an earnest commitment to resolving customer issues, and prompt responsiveness in aiding customers. Notably, this study reinforces the affirmative connection between E-satisfaction and E-trust, which emerge as influential drivers of E-loyalty.

Hence, we posit the following hypotheses:

H3a: Customer Service Quality positively influences E-loyalty.

H3b: Customer Service Quality positively influences E-satisfaction.

H3c: Customer Service Quality positively influences E-trust.

Mobile Application Design and Its Influence on E-Loyalty

In the context of mobile applications designed for online shopping and e-commerce environments, the interface between customers and sellers is embodied by website and mobile application design. The rapid evolution of mobile shopping has empowered consumers, placing mobile retailers at their fingertips and enabling purchases from anywhere, at any time, via mobile devices, eliminating the need for physical commutes. Empirical evidence from a study assessing mobile shopping applications and customer service quality conducted by Omar et al. (2021) highlights the profound impact of aesthetic design in mobile shopping apps on customer satisfaction. Moreover, it establishes a positive relationship between customer satisfaction and loyalty. Consequently, when customers experience satisfaction with mobile applications characterized by commendable aesthetic design, they are more inclined to continue shopping through these apps or express their intent for future repurchases.

Enhancing the information and navigation design, particularly by providing comprehensive product information on e-commerce websites or mobile applications, instills greater confidence among online shoppers when making purchases from virtual stores (Lim et al., 2022). Website interface features encompassing content, presentation quality, and system design features manifest as visible system attributes perceivable by users. The quality of information provided is referred to as information quality, encompassing dimensions of accuracy, relevance, comprehensiveness, and alignment with user preferences. In this regard, service quality encompasses the support and information reliability furnished by retailers and system providers to customers.

Mobile shopping encompasses the characteristics of an innovative information system and a novel marketing channel, reshaping consumer consumption dynamics and allowing retailers to tap into

emerging business avenues. Given its multidimensional underpinnings, perceived usefulness is intrinsically linked to individual impacts.

In a study conducted by Al-Adwan and Al-Horani (2019), the pivotal role of website design in enhancing consumers' e-satisfaction was revealed. As postulated by Nasimi et al. (2018), the user interface wields a substantial influence on customer satisfaction, albeit with a limited effect on consumer trust. Further augmenting user experience, provisions such as site maps, guided navigation, and search engines in online shops catering to customers' needs Mitchev et al. (2022) substantiate the enhancement of satisfaction through an intuitively designed, user-friendly interface. One notable recommendation for enhancing user-friendliness is incorporating features like "search by image" in mobile application sites, facilitating user-friendly item searches (Omar et al., 2021). In light of these findings, it is evident that customer satisfaction is intricately intertwined with Mobile Application Design, serving as the foundational platform for E-commerce operations and customer attraction. A seamless user experience, characterized by perceived ease of use and usability, accentuates customer satisfaction.

Hence, we posit the following hypotheses:

H4a: Mobile application design influences E-loyalty.

H4b: Mobile application design affects E-satisfaction.

H4c: Mobile application design influences E-trust.

Promotions (Marketing Offers) and Their Impact on E-Loyalty

In e-commerce and online shopping, promotional strategies, often referred to as marketing offers, have emerged as critical components in the fierce competition to gain a competitive advantage and attract customers. In the time frame considered for this study, the adoption of dynamic pricing mechanisms was not in practice. Consequently, variations in product prices primarily stemmed from the application of discounts. Notably, these discounts have positively influenced customer retention, thereby presenting an opportunity for further optimization by introducing dynamic pricing strategies. As Croes et al. (2019) suggested, Dynamic pricing can enhance sales by tailoring prices to match individual customer profiles and specific moments in time, a practice anticipated to bolster customer loyalty.

The research conducted by Goutam et al. (2021) yields valuable insights into the role of perceived value in shaping customer perceptions and behaviors. Perceived value, essentially the customer's assessment of the balance between perceived benefits and perceived sacrifices associated with a product or service, emerges as a pivotal factor influencing customer satisfaction, trust, commitment, and cognitive loyalty. When customers perceive promotions and marketing offers as mechanisms that enhance the overall value proposition, their satisfaction levels rise, setting the stage for repeat

purchases and forming a robust sense of loyalty.

This concept of perceived value further underscores the impact of promotions on customer satisfaction. Sastrawan and Suparna (2021) researched the relationship between promotions and repurchase intentions, and their findings support the assertion that promotions play a positive role in enhancing customer satisfaction. This heightened satisfaction, in turn, profoundly affects customer intentions to make repeat purchases, thus contributing to the development of customer loyalty. Essentially, the hypothesis positing the significant influence of promotions on satisfaction and repurchase intent (loyalty) finds validation in this study.

This hypothesis maintains relevance not only within the context of Ghana's e-commerce industry but also in the broader area of online services, as evidenced by a study conducted by Mihardjo and Ningtyas (2023). Their research reaffirms that online promotions and attractive product offerings wield substantial influence in the quest to attain customer satisfaction. Consequently, online promotions are effective tools for attracting and retaining a customer base, aligning with the hypothesis that promotions and product offerings significantly impact customer satisfaction and the propensity for customers to repurchase.

Ultimately, in consonance with prior research, this study indicates the substantial impact of promotions on customer satisfaction, with satisfaction emerging as a pivotal factor positively associated with customer loyalty (Suharyono & Widiyanto, 2021). These findings collectively emphasize the central role of promotions in shaping customer perceptions and behaviors, ultimately fostering the development of loyal customer relationships within the dynamic realm of e-commerce.

H5a: Promotion and Marketing offers exert a substantial influence on e-loyalty.

H5b: Promotion and Marketing offers significantly impact e-satisfaction.

H5c: The impact of Promotion and Marketing offers on e-satisfaction is significant and noteworthy.

METHODOLOGY

Sample procedure

Data were collected from 320 participants from Ghanaian online shoppers. The survey targeted individuals aged 18-60 of both genders who have completed multiple online transactions on the specified e-commerce platform. Out of 450 given surveys, 320 responses were gathered using Google document questionnaires. All questionnaires were sent out from June 2023 until August 2023, and data was obtained. The reliability of the initial survey tool was assessed using Cronbach's Alpha. Cronbach's Alpha tests revealed that the instruments were reliable enough (more than 0.7).

The measurement of different variables

To achieve the research objectives, this study employed 28 measurement instruments in the form of questionnaires and a demographic survey. Using confirmatory factor analysis and Cronbach's Alpha, we evaluated the validity and reliability of the instrument. The test results have confirmed its reliability and validity. Utilizing a Likert scale extending from 1 (indicating strongly disagree) to 5 (indicating strongly agree) was a component of the research construct. Table 1 contains all item scales and their respective explanation.

Table 1: Measurements

| Dimension/Variable | Item | Source |
|---|--------|---|
| E-Satisfaction (ES) E-Trust (ET) | 5 5 | (Pandiangan et al., 2021) and (Purwanto, 2022) (Fernández-Bonilla et al., 2022) |
| Customer Service Quality (CSQ) | 4 | (Juliana et al., 2021; Riskarini & Ardianto, 2021) |
| Mobile Application Design (MAD) | 4 | |
| Marketing Promotion (MP) | 4 | |
| E-loyalty | 6 | (Buhalis et al., 2020; Riskarini & Ardianto, 2021) |

Common method Bias

The present study uses a variety of methods to lessen the impact that the possibility of common technique bias might have on our findings (Feng et al., 2018). To begin, the items to be measured were distributed around and assigned randomly to the various sections of the questionnaire. The questions have been presented in numerous ways, bringing us to our second point. Third, every respondent provided two responses, which helped limit the possibility of bias caused by using a standard procedure.

Data analysis procedures

The quantitative research used survey data and statistical analysis to examine E-commerce customer loyalty's determinants. Data gathered were extracted from the Google Forms website into an Excel worksheet for a complete data cleaning. The cleaned Excel data was then loaded into the SMART-

PLS Software. The researcher used software to assist in the data analysis, using approaches such as partial least squares and modeling of structural equations. Structural equation modeling comprises a collection of statistical methodologies utilized to quantify and examine the associations between observable and unobservable variables (Beran & Violato, 2010). This method has extensively been used in behavioral research that used primary data (Mintah et al., 2022) due to its robustness. Analyzing the linear causal link between variables while considering measurement error is similar to regression analysis but more effective. Figure 1 represents the structural equation model used in this analysis.

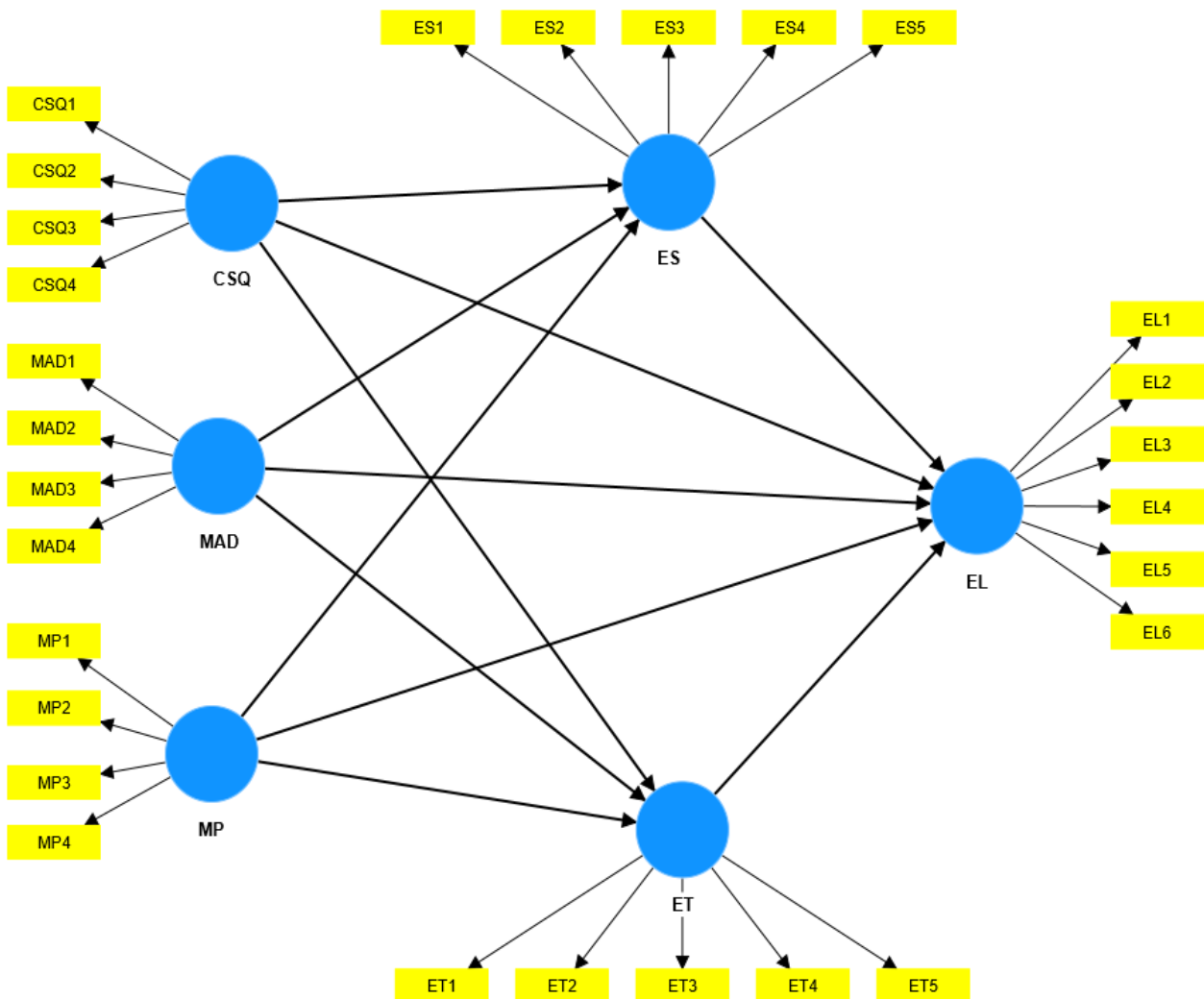


Figure 1. The model of the study

RESULTS

Respondent Demographic profile

Examining the demographic characteristics of respondents is a crucial aspect of any research project. Typically, the nature and methodology employed to resolve a particular issue are influenced by the demographic characteristics of respondents. Numerous scholarly studies, such as those conducted by Othman et al. (2021) and (Ahakwa et al., 2021), contend that the demographic characteristics of survey respondents are essential for augmenting and resolving particular problems. The research is centered on Ghanaian online shoppers who have conducted their purchase transactions through mobile applications. The primary objective is to delve into the factors associated with consumer satisfaction that drive customer loyalty within the e-commerce domain. The survey will target individuals aged 18-60 of both genders who have completed multiple online transactions on the specified e-commerce platform. Incorporating repeat transactions is fundamental, as it serves as a vital indicator of and representation of customer loyalty, a pivotal focus of this research inquiry. The demographic revealed that 142 were males, representing 44.4%, and 178 were females, representing 55.6%.

Measurement Model Assessment

Table 3 illustrates the results of the preliminary evaluation of the measurement data model. The validity and reliability of the data are determined through an evaluation of the measurement model using statistical techniques such as Factor Loading, Cronbach Alpha, Composite Reliability, and Average Variance Extracted (AVE). Table 2 demonstrates that each factor loading for the various constructs studied exceeded the 0.6 cut-off value recommended by (Chin et al., 2008).

According to Hair et al. (2017), to determine the variables' inner consistency, Cronbach's alpha was more than 0.70. Composite dependability levels in the range of 0.861 to 0.897 are higher than the required value of 0.7. It is recommended that the values of the AVE should not fall below the threshold of 0.5 as a general rule (Hair et al., 2017). Table 3 illustrates that the AVE values of the diverse constructs surpassed the threshold of 0.5, indicating a statistically favorable outcome for the analysis.

Collinearity Values

Multicollinearity is a problem that can develop in many different kinds of studies depending on the nature of the research data. This problem emphasizes that exogenous variance explanations inside an endogenous structure cannot be combined to explain the variance of a single endogenous variable. The degree of multicollinearity is generally accepted using a variance inflation factor (VIF). One popular method for quantifying multicollinearity is the Variance Inflation Factor (VIF) (O'Brien, 2007). When the most outstanding value of the VIF is greater than 5, as stated by Hair et al. (2017), multicollinearity is present. Table 2 shows that all VIF values, comprising 1.396 to 2.056, are below five.

Table 2: Evaluation of the Validity and Reliability of the Construct

| CONSTRUCTS | ITEMS | LOADINGS (≥ 0.60) | VIF | Cronbach's alpha (≥ 0.70) | Composite reliability (rho_c) (≥ 0.70) | The average variance extracted (AVE) (≥ 0.50) |
|----------------------------------|-------|-----------------------------|-------|--|--|---|
| Customer Service Quality | CSQ1 | 0.781 | 1.530 | 0.785 | 0.861 | 0.608 |
| | CSQ2 | 0.781 | 1.551 | | | |
| | CSQ3 | 0.778 | 1.535 | | | |
| | CSQ4 | 0.78 | 1.572 | | | |
| E-Customer Loyalty | EL1 | 0.736 | 1.667 | 0.865 | 0.899 | 0.598 |
| | EL2 | 0.804 | 1.999 | | | |
| | EL3 | 0.774 | 1.779 | | | |
| | EL4 | 0.759 | 1.717 | | | |
| | EL5 | 0.799 | 1.931 | | | |
| | EL6 | 0.766 | 1.751 | | | |
| E-Satisfaction | ES1 | 0.832 | 2.056 | 0.849 | 0.892 | 0.624 |
| | ES2 | 0.801 | 1.839 | | | |
| | ES3 | 0.780 | 1.728 | | | |
| | ES4 | 0.754 | 1.647 | | | |
| | ES5 | 0.780 | 1.742 | | | |
| E-Trust | ET1 | 0.732 | 1.550 | 0.825 | 0.877 | 0.589 |
| | ET2 | 0.803 | 1.805 | | | |
| | ET3 | 0.762 | 1.628 | | | |
| | ET4 | 0.780 | 1.773 | | | |
| | ET5 | 0.758 | 1.666 | | | |
| Mobile Application Design | MAD1 | 0.760 | 1.492 | 0.776 | 0.857 | 0.599 |
| | MAD2 | 0.770 | 1.528 | | | |
| | MAD3 | 0.739 | 1.396 | | | |
| | MAD4 | 0.824 | 1.708 | | | |
| Marketing Promotion | MP1 | 0.796 | 1.573 | 0.793 | 0.866 | 0.617 |
| | MP2 | 0.773 | 1.550 | | | |
| | MP3 | 0.787 | 1.658 | | | |
| | MP4 | 0.785 | 1.614 | | | |

Note(s): $C\alpha \geq 0.7$; $CR \geq 0.7$; $AVE \geq 0.5$; loadings ≥ 0.6

CSQ= Customer Service Quality; EL=E-Customer Loyalty; ES= E-Satisfaction; ET= E-Trust; MAD= Mobile Application Design; MP= Marketing Promotion

The conceptual model held 28 components for study. All items and six latent variable measures had Cronbach's alphas and Composite reliabilities above 0.707, as shown in Table 2. (Hair et al., 2017). The outcomes were deemed acceptable in the evaluation of recently developed measurement instruments. Based on the above, a significant level of reliability was established.

Discriminant and Convergent Validities

Convergent validity is assessing coherence among various measures within a given conceptual framework. When evaluating convergent validity, it is necessary to consider the indicator's factor loading, average variance, and composite reliability (Hair et al., 2017). Interpretation of the concept may fall within a range of values from 0 to 1. Hair et al. (2017) state that the AVE value needs to exceed 0.50 to establish convergent validity. All values fall within the recommended range as outlined in Table 2.

According to (Hair et al., 2017), Fornell-Lacker specifies that diagonal elements be assigned the square roots of AVE. The square root of the AVE of the latent construct is displayed in the diagonal of Table 3. Furthermore, it can be deduced that the AVE increases as the row or column number increases. According to Fornell and Larcker (1981) and supported by (Hair et al., 2017), the components have a significant correlation with their corresponding indicators when compared to other model constructs, indicating a high level of divergent validity.

Table 3: Fornell-Larcker Criteria

| | CSQ | EL | ES | ET | MAD | MP |
|------------|-------------|--------------|-------------|--------------|--------------|--------------|
| CSQ | 0.78 | | | | | |
| EL | 0.726 | 0.773 | | | | |
| ES | 0.737 | 0.805 | 0.79 | | | |
| ET | 0.72 | 0.748 | 0.799 | 0.767 | | |
| MAD | 0.732 | 0.741 | 0.747 | 0.720 | 0.774 | |
| MP | 0.720 | 0.746 | 0.809 | 0.767 | 0.721 | 0.785 |

Analyzing Structural Models

An improved version of the PLS method is utilized to analyze the structural model and investigate the interrelationships between latent variables, which are independent and dependent. The theoretical framework of the internal composition comprises a cumulative sum of six unobservable variables. The structural model's impacts were analyzed to test the study's assumptions, assess the model's predictive ability, and identify structures' vitality and reliability. The four primary evaluation criteria were the path coefficient value, T-statistic, the significance level of the model's prediction ability (Q2), and the coefficient of determination (R2). The same procedure was used in a bootstrapping assessment (Hair

et al., 2017). The results can be seen in Figures 2 and 3

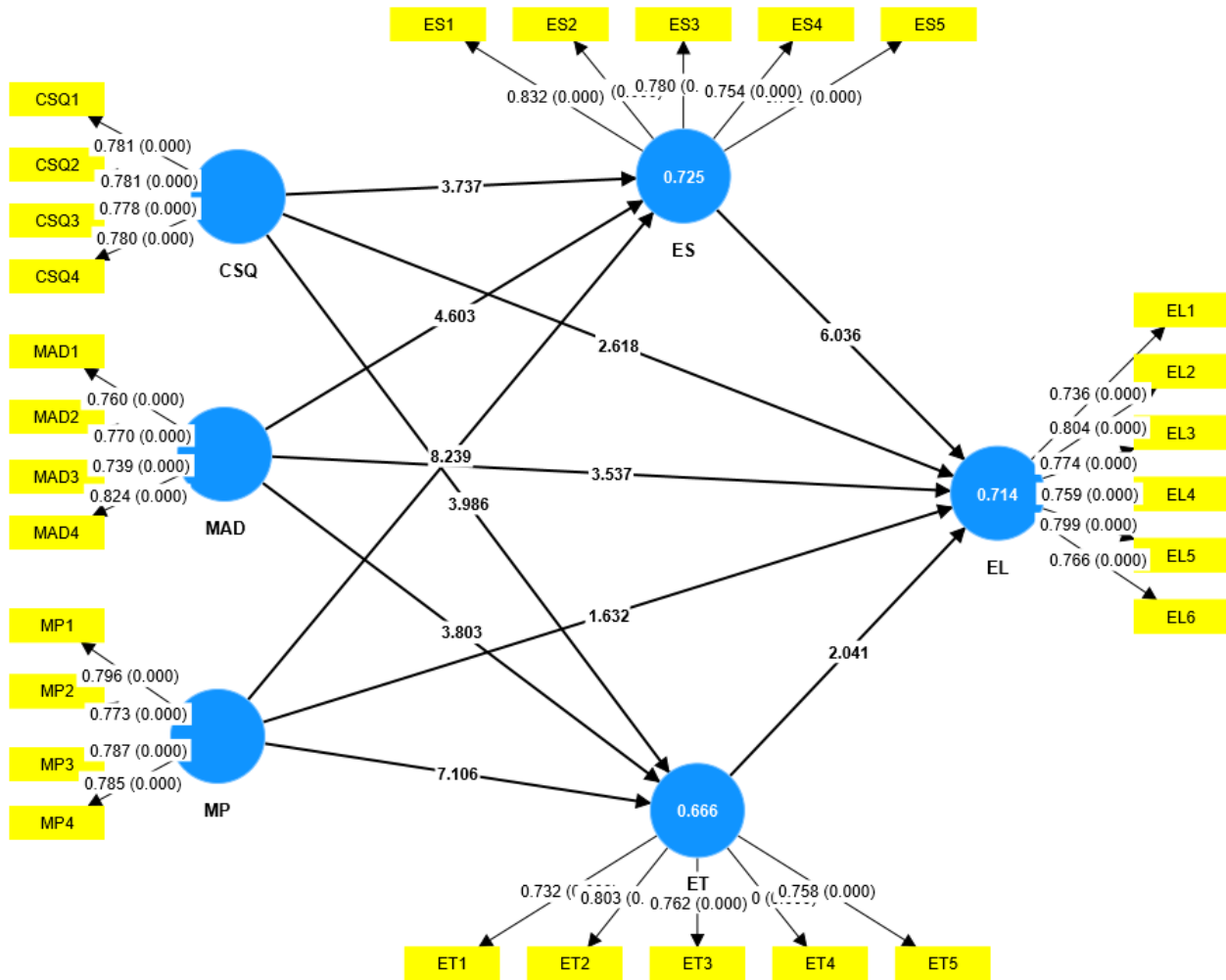


Figure 2: Measurement model results

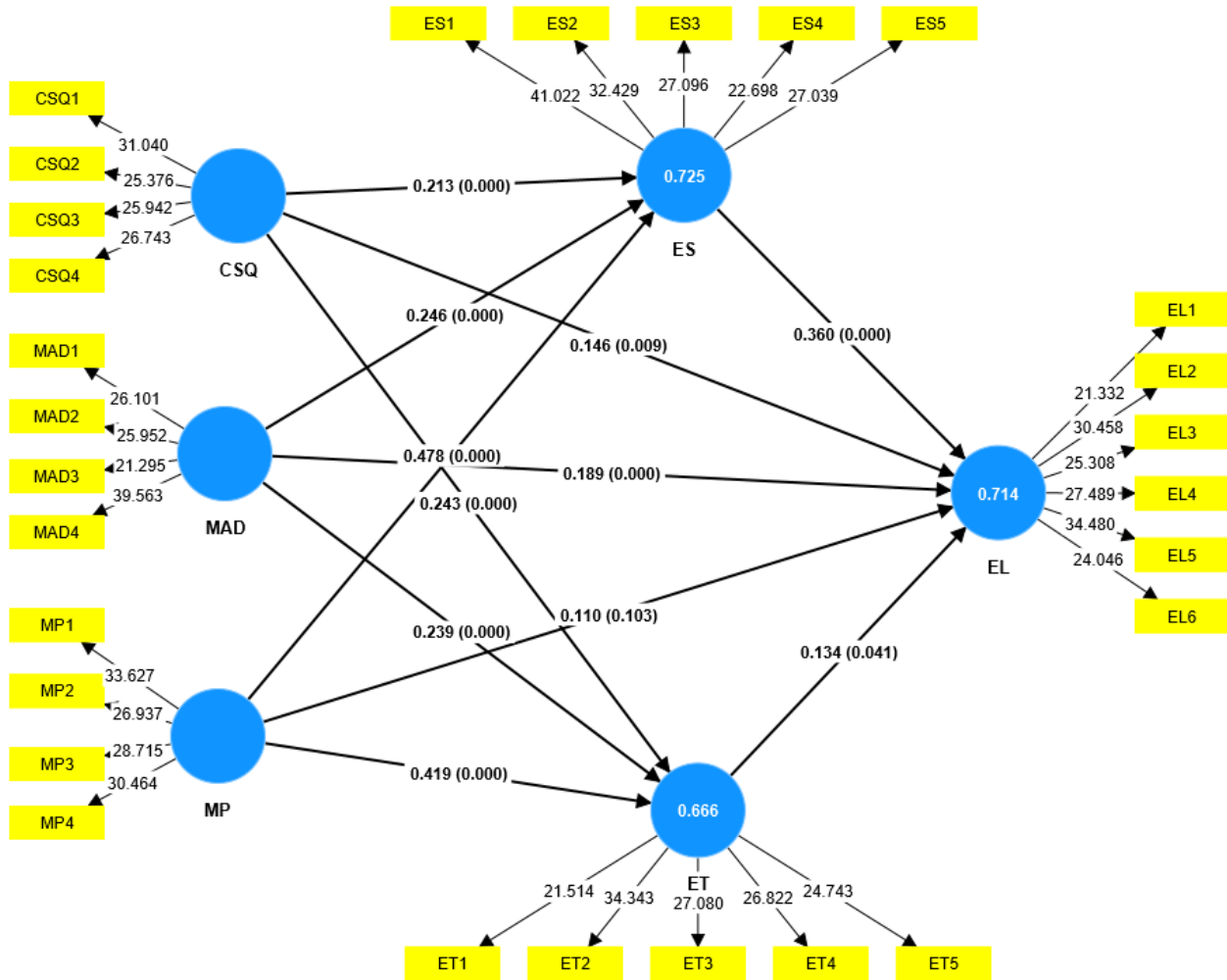


Figure 3. The Value of the Path Model

Coefficient and predictive relevance

The connection is substantial, moderate, or weak, and the impact is significant if the R2 value is larger than 0.67, 0.33, or 0.19 (Chin, 1998). This analysis showed moderate R2.

Q2 determines the framework's statistical relevance. According to Hair et al. (2017), Q2 values should be much higher than zero to show that the exogenous structure predicts the endogenous system. Figure 4 shows that E-Customer loyalty, E- Satisfaction, and E-trust cross-validation values were 0.714, 0.725, and 0.666, respectively. The test results were good.

Table 4: Coefficient and predictive relevance

| Constructs | R ² | Q ² |
|--------------------|----------------|----------------|
| E-Customer Loyalty | 0.719 | 0.714 |
| E-Satisfaction | 0.727 | 0.725 |
| E-Trust | 0.669 | 0.666 |

Structural Model Path Coefficient

Indexes and path factors determine the dependent latent variable's internal structure model. Values for R² and Q², as well as t-value and path analyses, were derived using the structural model (Hair et al., 2017).

Examining hypotheses

Figure 3 and Table 6 reflect the hypothesis test procedure used in evaluating the structure of the model. This research tests eleven hypotheses on the connection between E-Loyalty and its determinants, including customer service quality, mobile application design, marketing promotion, E-satisfaction, and E-trust. As presented in Table 6a, the findings indicate that CSQ, ES, ET, MAD significantly correlates with the EL ($\beta = 0.146$, $t = 2.618$, $p=0.009$), ($\beta = 0.360$, $t = 6.036$, $p=0.000$), ($\beta = 0.134$, $t = 2.041$, $p=0.041$), ($\beta = 0.189$, $t = 3.537$, $p=0.000$) thereby providing support for H3a, H1, H2, H4a. Moreover, there was a negative relationship between MP and EL ($\beta = 0.110$, $t = 1.632$, $p=0.103$), thereby rejecting the hypothesis 5a. The findings indicate that CSQ influences ES and ET ($\beta = 0.213$, $t = 3.737$, $P=0.000$, ($\beta = 0.243$, $t = 3.986$, $p=0.000$) respectively, thereby confirming the hypothesis 3b and 3c. The results indicate a significant connection between MAD and ES AND ET, as evidenced by the beta coefficient of ($\beta = 0.246$, $t=4.603$, and $p=0.000$), ($\beta = 0.239$, $t = 3.803$, $P=0.000$). Therefore, hypotheses 4b and 4c are accepted. Additionally, the results ($\beta=0.478$, t-value of 8.239, $P=0.000$), ($\beta = 0.419$, $t = 7.106$, $P=0.000$) suggest that MP has a substantial connection with ES and ET, respectively, thereby supporting the hypothesis of 5b and 5c. Table 5a presents a synopsis of the findings of the hypothesis validation.

In summary, the findings indicate that customer service quality and mobile application design are crucial in influencing e-customer loyalty, satisfaction, and trust in the Ghanaian e-commerce market. While influential in other aspects, marketing promotions do not significantly affect e-customer loyalty in this context. These results offer valuable insights for e-commerce businesses in Ghana, emphasizing the importance of customer service quality and mobile app design to enhance customer satisfaction, trust, and loyalty.

Second, we assessed the indirect associations by evaluating the constructs' mediating effects. The

connection between MP and EL, CSQ and EL, and the association between MAD and EL were strongly and significantly mediated by ES ($\beta = 0.173$, t value = 4.197, $P = 0.000$), ($\beta = 0.077$, t value = 2.925, $P = 0.003$), ($\beta = 0.089$, t value = 3.852, $P = 0.000$) respectively. Finally, ET did not have any significant connection between MP and EL, CSQ and EL, MAD and EL with ($\beta = 0.056$, t value = 1.958, p value = 0.050); ($\beta = 0.033$, t value = 1.706, $P = 0.088$); ($\beta = 0.032$, t value = 1.772, $P = 0.076$) respectively as seen in 5b.

In summary, these findings emphasize the importance of the sequence of Customer Service Quality (CSQ) to E-Satisfaction (ES) to E-Customer Loyalty (EL), as well as Mobile Application Design (MAD) to E-Satisfaction (ES) to E-Customer Loyalty (EL) in the context of the Ghanaian e-commerce market. These sequences have a significant positive impact on e-customer loyalty. However, the path involving Marketing Promotion (MP) to E-Trust (ET) to E-Customer Loyalty (EL) is not statistically significant and does not strongly influence e-customer loyalty. These insights can guide e-commerce businesses in optimizing their strategies to enhance customer satisfaction and loyalty.

Table 5a: Hypotheses Testing

| Relationships | Path | mean | Standard deviation | T statistics | P values | Decision |
|---------------------|-------|-------|--------------------|--------------|----------|----------|
| CSQ -> EL | 0.146 | 0.146 | 0.056 | 2.618 | 0.009 | Accepted |
| CSQ -> ES | 0.213 | 0.212 | 0.057 | 3.737 | 0.000 | Accepted |
| CSQ -> ET | 0.243 | 0.239 | 0.061 | 3.986 | 0.000 | Accepted |
| ES -> EL | 0.36 | 0.362 | 0.060 | 6.036 | 0.000 | Accepted |
| ET -> EL | 0.134 | 0.134 | 0.066 | 2.041 | 0.041 | Accepted |
| MAD -> EL | 0.189 | 0.188 | 0.053 | 3.537 | 0.000 | Accepted |
| MAD -> ES | 0.246 | 0.247 | 0.053 | 4.603 | 0.000 | Accepted |
| MAD -> ET | 0.239 | 0.243 | 0.063 | 3.803 | 0.000 | Accepted |
| MP -> EL | 0.110 | 0.110 | 0.068 | 1.632 | 0.103 | Rejected |
| MP -> ES | 0.478 | 0.478 | 0.058 | 8.239 | 0.000 | Accepted |
| MP -> ET | 0.419 | 0.420 | 0.059 | 7.106 | 0.000 | Accepted |

CSQ= Customer Service Quality; EL=E-Customer Loyalty; ES= E-Satisfaction; ET= E-Trust; MAD= Mobile Application Design; MP= Marketing Promotion

Table 5b: Evaluating Indirect Hypotheses

| Relationships | Path | mean (M) | Standard deviation (STDEV) | T statistics (O/STDEV) | P values | Decision |
|------------------------------|-------------|-----------------|-----------------------------------|---------------------------------|-----------------|-----------------|
| MP -> ET -> EL | 0.056 | 0.056 | 0.029 | 1.958 | 0.050 | Rejected |
| CSQ -> ES -> EL | 0.077 | 0.077 | 0.026 | 2.925 | 0.003 | Accepted |
| MAD -> ES -> EL | 0.088 | 0.089 | 0.023 | 3.852 | 0.000 | Accepted |
| MP -> ES -> EL | 0.172 | 0.173 | 0.035 | 4.917 | 0.000 | Accepted |
| CSQ -> ET -> EL | 0.033 | 0.033 | 0.019 | 1.706 | 0.088 | Rejected |
| MAD -> ET -> EL | 0.032 | 0.032 | 0.018 | 1.772 | 0.076 | Rejected |

Discussions/Conclusion

In this comprehensive study, we diligently collected and processed data to delve into the intricate relationships between key variables in the e-commerce sector: customer service quality, mobile application design, marketing promotions, and their collective impact on customer trust, satisfaction, and loyalty.

The statistical analysis results reveal several significant relationships between key variables in the study. The relationships between Customer Service Quality (CSQ) and E-Customer Loyalty (EL), E-Satisfaction (ES), and E-Trust (ET) all show significant positive associations, with p-values less than 0.05. This indicates that higher levels of customer service quality are linked to increased customer loyalty, satisfaction, and trust in e-commerce. These relationships have been accepted as statistically valid.

Similarly, the relationships between Mobile Application Design (MAD) and EL, ES, and ET are also significant and positive. This implies that better mobile application design leads to higher levels of e-customer loyalty, satisfaction, and trust, and these relationships have been accepted. However, the relationship between Marketing Promotion (MP) and E-Customer Loyalty (EL) did not yield a statistically significant result, as the p-value is greater than 0.05. This suggests that marketing promotions, in this specific study, do not significantly impact e-customer loyalty.

The study's results unequivocally affirm the pivotal role of customer satisfaction as a driving force

behind customer loyalty. Various factors, including the quality of customer service, the effectiveness of marketing promotions, and the user-friendly design of mobile applications, mold customer satisfaction. To optimize the overall customer experience, e-commerce platforms must prioritize enhancing their mobile applications streamlining functionality, and user interface for greater efficiency. Augmenting these technical improvements with exceptional customer service and compelling marketing promotions is a proven strategy to elevate customer satisfaction and nurture and sustain customer loyalty.

However, it is worth noting that our initial hypothesis regarding the direct impact of marketing promotions on loyalty did not receive empirical support within the study's findings. While promotions certainly play a role in influencing customer behavior, the study suggests that their impact on long-term loyalty is more nuanced and interdependent with other factors. Nonetheless, it is essential to recognize the study's scope and limitations. This research offers valuable insights into a specific subset of the thriving e-commerce market in Ghana, representing active participants in online transactions. The study's sample size and focus present opportunities for further investigations into the intricate dynamics of customer behavior and loyalty within a broader context.

These results align with existing literature on the importance of customer service quality and user-friendly mobile application design in enhancing customer satisfaction and driving customer loyalty in the e-commerce context (Al-Adwan & Al-Horani, 2019; Lim et al., 2022; Omar et al., 2021). Marketing promotions were also found to play a significant role in influencing satisfaction and loyalty, aligning with research conducted by (Goutam et al., 2021; Sastrawan & Suparna, 2021). However, the absence of significance in the paths related to trust suggests that trust may operate differently or through other mediating factors in this study's context. Further research could explore these relationships in greater depth and consider additional variables to gain a more comprehensive understanding.

In conclusion, these results provide valuable insights for e-commerce businesses in Ghana. While marketing promotions, customer service quality, and mobile app design significantly influence e-customer satisfaction and trust, they may impact e-customer loyalty. Businesses should consider a holistic approach that prioritizes customer service quality, mobile app design, and effective marketing promotions to foster customer satisfaction and long-term loyalty. Further research can explore the intricate dynamics of these relationships to refine e-commerce strategies further.

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