

Do Female Consumers Care About the Continuance Use of Grocery Applications? Antecedents, Drivers, and Consequences of Hedonic Value and User Experience

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Abstract

The continued usage of mobile applications (apps) is imperative beyond initial adoption for operators to attain sustainability and profitability. Yet, female grocery shoppers seem to be frequently downloading grocery apps, then discontinue usage. Not much attention has focused on the decomposed hedonic values behind the continuance use intention of grocery shopping apps among female users. To close the identified research gap, this study examined mediating (decomposed hedonic values) and moderating (user experience) roles by integrating the Experiential Value Theory and the Expectation-Confirmation Model. 314 online self-administered surveys were obtained among female grocery shopping app users. PLS-SEM was used to test the proposed mediation and moderation relationships using the latest version of SmartPLS. Findings show that (a) all direct relationships were supported, (b) the decomposed hedonic value experiences did not mediate the confirmation-satisfaction relationship, and (c) the grocery app user experience moderated the satisfaction and hedonic value relationships. The theoretical significance is the empirical extension of the ECM by incorporating the mediating role of hedonic value experiences in post-adoption behaviour, as well as confirming the moderating effect of user experience on the decomposed hedonic value and satisfaction relationship. The implications for grocery app businesses and academicians are provided.

Keywords: aesthetics, continuance use intention, expectation-confirmation model, experiential value theory, playfulness, user experience

1. Introduction

Coupled with the growing internet penetration and access to smartphone devices, the process of shopping through electronic commerce (e-commerce) as well as mobile commerce (m-commerce) has become of interest to retailers, since smartphones provide consumers with ubiquitous shopping benefits. M-commerce has further enabled the use of mobile applications (mobile apps), with Xu et al. (2014) proving that the power of mobile apps encourages customers to purchase from retailers rather than other tech-oriented platforms. Some of the reasons for the preference, in favour of mobile apps are attributed to them being more conducive than going in-store, visiting websites via mobile, functionalities, and seamless features (Madureira et al., 2020; Natarajan et al., 2017).

Amidst the lucrative benefits of mobile apps, Picalate (2025) enumerated that in Q3 2024 abandoned mobile apps increased by 21% year-on-year on the Apple store, whereas Google Play store witnessed an enormous 77% year-on-year retention reduction. In China, for example, females account for over 60% of mobile app users and males (40%) (Lyu et al., 2024). Of concern is that only 26% females in China, with similar global trends, make use of an app more than once after downloading it (Lyu et al., 2024). Generally, mobile app users tend to use a particular mobile app and resultantly discontinue or switch to other apps (Hoehle & Venkatesh, 2015; Torous et al., 2021). In an emerging economy like South Africa, there are no current statistics on gender-specific mobile app user comparisons, but it is important to note that females are 15% less likely than males to utilise mobile internet (Broadband, 2025). The mobile app's 30-day retention rate is less than 3.41%, with the churn rate hovering around 62% aligning with the broader average for Africa (Howarth, 2025). Based on the worrying statistics provided, operators and mobile app designers are faced with a huge challenge in how to increase and sustain the continued use of their apps. Further contributing to concerns about South African female consumers' commitment, engagement, and their continued use of mobile apps.

To realise the success of grocery shopping apps hinges on their continued use rather than the initial adoption phase (Akdin

et al., 2022; Cao et al., 2018). Aspects of enjoyment and happiness in using the app may prompt continuance use of apps, though the drivers of initial adoption of grocery apps and continuance use can be different among demographics, specifically for female users. The selection of females as the demographic of interest is echoed by the findings of Hou and Elliott (2021), confirming that female smartphone users make more mobile-related purchases and engage more frequently in mobile shopping than the opposite gender. These findings informed the researcher to focus on females' continuance use of grocery shopping apps, yet the precursors that lead to continuance use of such apps still need further enquiry, and to encourage them to keep using grocery apps for shopping purposes.

To address the decline in the continuance use intention of grocery apps, the researcher proposed the incorporation of decomposed hedonic values (playfulness and aesthetics) as potential contributors of continued use as presented in the conceptual model (see Figure 1). There is a paucity of research applying the Expectation Confirmation Model (ECM) with that of Experiential Value Theory (EVT) in addressing continuance use in a single study (Chabata et al., 2024). The incorporation of decomposed hedonic value in grocery apps will stimulate user satisfaction, leading to a state of fulfilled use of the app and, in turn, further the desire to continue using the grocery app. Moreover, there is prevailing fragmentation on the moderating role of user experiences among various literature's causal relationships. Therefore, addressing the identified gaps within this empirical study can be beneficial to practice and theory. Theoretically, advancing the knowledge on female-oriented continuance use of mobile app studies will be addressed. On the practical side, this study provides recommendations for grocery app providers to better build successful app continuance use strategies among female shoppers to achieve better investment returns. Hence, the significance of this study is investigating the mediating and moderating precursors of continuance use of grocery apps among female shoppers. To bridge the prevailing research gaps, this study formulated the following research question:

What is the influence of decomposed hedonic value experience(s) on the continuance use intention of retail grocery apps among female shoppers?

1.1 Problem of the Study

Literature on the continuance use of m-commerce is in its infancy (Chabata et al., 2024) and has focused mainly on multiple-user characteristics to predict its adoption (Chopdar et al., 2022). Previous research has centred on the initial use and adoption of m-shopping, in general (Chen, 2018; Marriott & Williams, 2018). Whereas a paucity of studies has explored the post-adoption behaviour relative to mere adoption studies, particularly in emerging countries (Marriott & Williams, 2018). A total of 68 peer-reviewed journal articles from top accredited databases were screened based on the keyword search. As a result, the author became more informed on the existence of scant empirical studies that examined users' intentions to specifically continue using grocery apps from the influence of decomposed hedonic value (Nguyen, et al., 2025; Long & Suomi, 2024; Palamidovska-Sterjadovska et al., 2024) and there was a dearth in studies that investigated the continuance use intention of the same apps among the most frequent shoppers (females) in the South African context (Akram et al., 2024; Hou & Elliott, 2021; Lyu et al., 2024). To the best of the researcher's knowledge, backed by the extensive review of literature, the extended ECM by the EVT, with the incorporation of user experience as a moderator to assess continuous intention to use grocery apps, has not been examined. Consequently, this study examines the mediation of the decomposed hedonic value on confirmation and satisfaction, as well as the moderating role of user experience on the decomposed hedonic value and satisfaction as antecedents of the continuance use intention of grocery apps. Given the importance of value experiences and the identified mediation and moderation gaps in literature, the examination of the role of decomposed hedonic values in grocery app continuance behaviour is not only necessary but also important in the current milieu.

1.2 Theoretical Framework

This study incorporated the Experiential Value Theory (EVT) and the Expectation Confirmation model (ECM), while user experience was incorporated as the moderating variable.

1.2.1 Experiential Value Theory

Experiential value is a psychological perception, emanating from users' actual use or indirect observation of a system (Mathwick et al., 2001). Perceived Value theory as well as Theory of Consumption values, considers value as a unidimensional construct (Hou & Elliott, 2021; Long & Suomi, 2024; Lyu et al., 2024; Tandon et al., 2021), whereas EVT by Mathwick et al. (2001) confirm that experiential value is a multidimensional construct and was considered more appropriate in applying to the context of this study. In this study, experiential value is considered as the user's assessment of the decomposed hedonic value (playfulness and aesthetics) of positive outcomes resulting from the use of the grocery app without considering the more obvious utilitarian value. This study specified the multidimensionality of hedonic experiential value, which has been underexplored and classified into playfulness as well as aesthetics, evidently missing in prior studies. Previous studies (Chung et al., 2016; Mahapatra, 2017; Shang & Wu, 2017) confirmed the significance of value attributes such as enjoyment and aesthetics as key to the initial adoption of technology, in general.

1.2.2 Expectation Confirmation Model

Bhattacharjee (2001) proposed the Expectation-Confirmation Model (ECM) in a seminal work. ECM is extended from the Expectation-Confirmation Theory (ECT) (Oliver, 1980) and adapted for the information system (IS) continuance use context. ECM is anchored on three main variables to better explain and predict consumers' IS continuance intention, satisfaction, confirmation, and perceived usefulness. Confirmation refers to the degree to which performance exceeds, equals, or falls short of an individual's expectations (Oliver & Swan, 1989). Oliver (1981) refers to satisfaction as the main psychological state resultant from emotion surrounding disconfirmed expectation, coupled with a consumer's previous feelings about the overall consumption experience. Chabata et al. (2024) stipulate that perceived usefulness signifies the belief in the expediency of an action applied when using IS.

Consumers follow a sequence that starts with forming a preliminary expectation of the good or service (Bhattacharjee, 2001). Thereafter, consumers form opinions about the IS's performance in comparison with their expectations (Daneji et al., 2018). Satisfaction then emerges from how well the initial consumer expectation matches the IS's perceived performance, in this instance, the grocery app. Those customers who are satisfied are more likely to engage in repurchase behaviour, conversely, dissatisfied customers are less likely to repurchase. ECM has become a frequently used and preferred underpinning model in IS post-adoption behaviour (Chung et al., 2016; Mahapatra, 2017; Shang & Wu, 2017; Susanto et al., 2016; Tam et al., 2020). To increase ECM's predictive power, an extension of the model was recommended (Bölen & Özen, 2020; Chabata et al., 2024; Tam et al., 2020). This study adopts the ECM as the theoretical lens to examine the continued use of grocery apps, by extending it with the EVT and user experience.

1.2.3 Conceptualisation and Hypothesis Development

Figure 1 presents the proposed conceptual framework anchored by the proposed hypotheses.

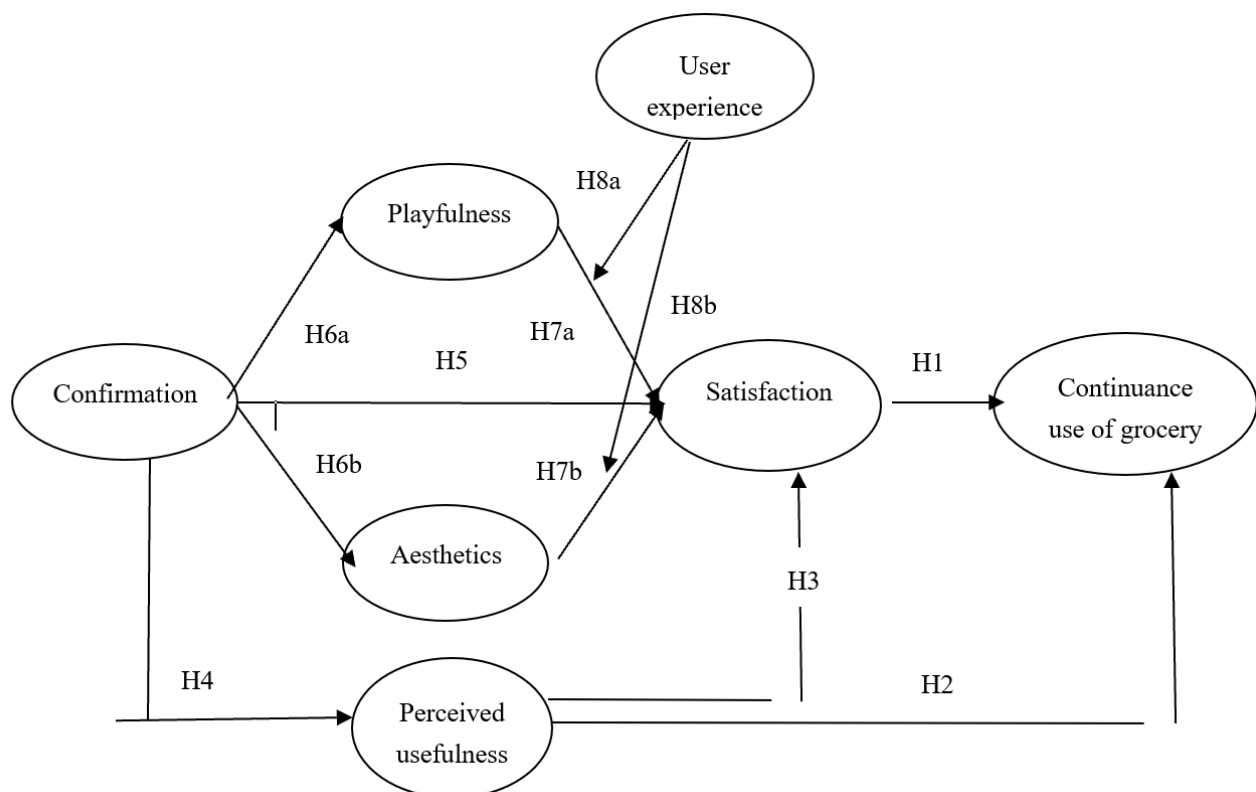


Figure 1. Conceptual model

Description: This is the conceptual model of the research.

1.3 Hypotheses Development

Satisfaction and continuance use intention

Parker and Mathews (2001), similar to Oliver (1981), postulate that satisfaction measures a person's psychological contentment attained by the relationship between a consumer's actual experience with a good or service and their expectations. In this study, satisfaction is related to female's feelings or attitudes toward using grocery apps, directly indicating how well the app meets their expectations. Bhattacharjee (2001) maintains that satisfaction is the strongest and

most impactful variable on continuance use. In the IS literature, satisfaction is a determining factor of continuance intention (Amoroso & Lim, 2017; Lyu et al., 2024). Correspondingly, Oliver (1980) affirms that the primary motivation for continuing to use a good or service is derived from the consumers' satisfaction with it. Lyu et al. (2024) conducted a meta-analysis of over 30 studies assessing the satisfaction and continuance use intention relationship, and the relationship was verified by 26 of the studies. Resultantly, satisfaction judgments elicit an emotional response that results in a desire to continue using IS. Based on prior literature evidence, this study proposes that: **H1: Satisfaction has a significant positive influence on the continuance use intention of grocery apps**

Perceived usefulness and continuance use intention

Davis et al. (1989, p. 985) define perceived usefulness as “the extent to which a person believes that a system enhances his or her performance”. Perceived usefulness is conceptualised as the extent to which female grocery app users find shopping through their apps relatively convenient. In the ECM, Bhattacharjee (2001) posited that IS users who find the system to be useful will eventually form an intention to continue using the IS. Several researchers have validated the influence of perceived usefulness on continuance use intention within the field of technology (Akdim et al., 2022; Ambalov, 2021; Sharma et al., 2022). Ferreira et al. (2023) as well as Chabata et al. (2024), within the mobile literature, found that there is a significant and positive impact of perceived usefulness on continuance use intention. Accentuating the support of the extant literature, the following hypothesis is proposed:

H2: Perceived usefulness has a significant positive influence on the continuance use intention of grocery apps

Perceived usefulness and satisfaction

The extent to which IS users find the system to be useful has a direct impact on the level of satisfaction with the system (Bhattacharjee, 2001). Bhattacharjee (2001) further proposed in his seminal work that perceived usefulness is key in influencing IS user satisfaction. In support of the views derived from Bhattacharjee (2001), there have been several other researchers who confirmed the substantial existence of perceived usefulness influencing user satisfaction (Kalinić et al., 2021; Kar, 2021). Other previous research confirmed the link between satisfaction being influenced by the perceived usefulness derived from using IS (Cheng, 2021; Long & Suomi, 2024). Translating the findings of prior studies, this study proposed that female grocery app users are more likely to be satisfied with the app if they believe the app will significantly help them achieve their usage objectives. On the backdrop of the provided prior literature, this study proposes the following hypothesis:

H3: Perceived usefulness has a significant positive influence on user satisfaction

Confirmation and perceived usefulness

Confirmation is the extent to which a user's usage experience supports their initial expectations (Loh et al., 2022). The underpinning ECM model established that confirmation significantly and positively influences perceived usefulness (Bhattacharjee, 2001). Equally, several studies have validated the positive relationship between technology user confirmation and perceived usefulness (Hossain et al., 2021; Park, 2020; Tam et al., 2020). Perceived usefulness of a technology usually rises when the user's experience surpasses their expectations, since the experience confirms their positive assessment of using the technology (Oliver, 1980; Pan et al., 2024). Since the confirmation of using a grocery app could have a potential positive impact on the female grocery app user's perceived usefulness, this study formulated the following hypotheses:

H4: Confirmation has a significant positive influence on perceived usefulness

Confirmation and satisfaction

The ECT precisely proposes that happiness in using technology results from the confirmed expectations of using the technology (Gupta et al., 2020). In alignment with the ECT and ECM model, it can therefore be established that, if female grocery app users' expectations are confirmed, they will be satisfied with their use of the app for shopping purposes. Among several other studies, Park (2020) as well as Tam et al. (2020) confirmed that user confirmation of IS significantly influences user satisfaction. Positive confirmation may result from the expected experience in using IS (Albayati, 2024), which then can improve general contentment that fosters satisfaction and more use of the technology (Baig & Yadegaridehkordi, 2025). The confirmation and satisfaction relationship is underpinned by the ECM and thus affirms that confirmation does influence satisfaction. Considering the earlier discoveries, the following hypothesis is proposed:

H5: Confirmation has a significant positive influence on user satisfaction

Confirmation and playfulness

Playfulness is characterised in fragmented ways, depending on the context of the research. Of importance is that Lin et al. (2005, p. 684) define playfulness “as a situational characteristic of the interaction between an individual and a situation”. The proposed definition aligns with the Flow Theory discovered by Csikszentmihalyi (2000, p. 14), who notes that “people seek flow

experience primarily for themselves,” making playfulness an intrinsic motive. Conceptually, this study regards playfulness as the interaction during the use of grocery apps. Lin et al. (2005) further claim that it is logical to assume that confirmation will influence perceived playfulness since the perceived utility and playfulness are common goals when using some technology. The confirmation and playfulness relationship is further cemented by the Cognitive Dissonance Theory, arguing that if IS user’s pre-acceptance fun beliefs are not validated during use, they may experience psychological strain or cognitive dissonance (Harmon-Jones & Mills, 2019). For the proposed reasons, it was only rational for this study to propose the following hypotheses:

H6a: Confirmation has a significant positive influence on the playfulness of the grocery app

Confirmation and aesthetics

Aesthetics is defined as an emotional joy or appeal that is conveyed through a subject in the form of color, typography, shape or image (Cyr et al., 2006). van der Heijden (2004) clarified that, since IS interfaces are visual in nature, they are also considered to possess perceived aesthetically pleasing information. Once the expectations of using IS are confirmed, there is potentially a positive influence on the aesthetics of the platform. Though few studies have validated the relationship between confirmation and perceived aesthetics (Chabata et al., 2024). This study bridged this gap by proposing the following hypotheses in the grocery app context.

H6b: Confirmation has a significant positive influence on the aesthetics of the grocery app

Playfulness and satisfaction

Playfulness relates to “a predisposition to define (or redefine) situations in ways that provide oneself (and possibly others) with amusement, enjoyment, and/or entertainment” (Barnett, 1990, p. 323). Playfulness is considered a hedonic value component, since it applies to the joy instead of the utility derived from using a technology. Sun and Yuan (2024) found that among other value types, hedonic value was the only type of value that had a positive and significant relationship with continuance intention through satisfaction. Fauzi and Sheng (2021) assert that hedonic value is the total assessment of the enjoyable experiential benefits perceived by customers in relation to IS. Thereby, with hedonic value, the IS user perceives hedonic value to be enjoyable, fun and exciting during the experience (Hirschman, 1983). When using grocery apps, female users expect the experience to be enjoyable, fun and exciting (Akel & Armağan, 2021). In this case the playfulness of the app features is a major driver of users’ continuous use (Oyibo & Vassileva, 2021) through user satisfaction. In the context of this study, playfulness, satisfaction, and users’ continuance intentions may exhibit a similar relationship. Therefore, this study formulated the following hypotheses:

H7a: Playfulness has a significant positive influence on user satisfaction

Aesthetics and satisfaction

Tractinsky et al. (2000) referred to aesthetics as the visual attractiveness of an interface, by emphasising that aesthetic perceptions shape IS user attitudes and experiences. Aesthetics in this study refer to the grocery apps interface that is appealing and attractive for use and considered a type of hedonic value, as confirmed by Mathwick et al. (2001). Aesthetics of an IS primarily influences satisfaction, which further influences purchase intentions. Lindgaard and Dudek (2003) opined that satisfied IS users are those who have experienced highly appealing websites, regardless of whether the platform is useful or not. Lindgaard and Dudek (2003) further emphasise that when website users, for example, do not pursue purchase tasks on the platform, the user satisfaction will primarily depend on the degree of the site’s aesthetic appeal. Similarly, when IS users deal with online purchase tasks, aesthetic formality may be influential on their satisfaction (Wang et al., 2010). In this study, when grocery app female shoppers engage in purchase tasks, the app’s aesthetic formality facilitates information processing and as a result, determines their shopping satisfaction. Underscoring the provided literature, this study presents the following hypotheses:

H7b: Aesthetics have a significant positive influence on user satisfaction

The moderating effect of user experience

Hassenzahl and Tractinsky (2006, p. 95) define user experience as “a consequence of a user’s internal state (predispositions, expectations, needs, motivation, mood), the characteristics of the designed system (e.g., complexity, purpose, functionality) and the context (the environment) within which the interaction occurs”. This study presumed the respondents were experienced users of their respective grocery app and not novices. Several studies have validated that advanced user experience influences users’ behavior in different contexts (Fishbein & Ajzen, 1977). Zhou et al. (2007) demonstrated that user experience positively affects the intention of customers to engage in the initial purchase of online products and the repurchase behaviour. Kwak et al. (2002) indicated that the adoption of e-commerce is conditioned by individuals’ prior user experience on the internet. While Gefen et al. (2003) found that IS users with prior user experience in online shopping are more likely to purchase a product online due to the expectation of higher benefits and fewer drawbacks using the channel. According to Hsieh and Liao (2011), user experience does moderate the effect of perceived

usefulness on behavioral intentions, similar to Dagger and O'Brien (2010), who verified that user experience moderates the effect of usability on customer satisfaction. Therefore, if users of grocery apps are satisfied with the app, their short-term behavior should be congruent with such feelings and frequency of use should increase for future purchases. The moderating role of user experience on decomposed hedonic value and satisfaction seems to be absent, and this study aimed to close this gap by proposing the following hypotheses:

H8a: The positive influence of playfulness on satisfaction is stronger for consumers with a high level of grocery app user experience

H8b: The positive influence of aesthetics on satisfaction is stronger for consumers with a high level of grocery app user experience

Mediating role of hedonic value

Karjaluoto et al. (2019) opined that hedonic value encompasses the emotions and enjoyment that IS users experience when making use of technology. Though some studies have conceptualised hedonic value as a unidimensional construct, Mathwick et al. (2001) discovered that the concept is fragmented and established that hedonic value is a multi-dimensional construct that is still understudied (Ambalov, 2021; Tam et al., 2020). For this reason, conceptually, hedonic value is a multi-dimensional construct that is considered as the aesthetics and playfulness experienced by female consumers while using a grocery app. Earlier discussions cemented that aesthetics and playfulness significantly and positively influence user satisfaction. Of concern is that the literature lacks extensive research on the mediating role of both aesthetics and playfulness on the confirmation-satisfaction relationship. Fundamentally, when confirmed expectations of using a grocery app lead to user satisfaction, it could also stand to reason that positive feelings, such as the playfulness of the grocery app may mediate the same relationship. Likewise, if confirmed expectations in using the grocery app can lead to user satisfaction, it could be true that positive emotions derived from the app's aesthetics could mediate the same relationship. The mediating role of playfulness and aesthetics may better assist in understanding the confirmation-satisfaction relationship in mobile app literature. Research on playfulness indicates that when expectations are successfully met, the playfulness of the system improves user satisfaction (Moon & Kim, 2001; Van Der Heijden, 2004). Suggesting that confirmation of expectations promotes perceived playfulness, which in turn enhances user satisfaction. Similarly, when grocery app users view the app as aesthetically appealing while confirmed expectations prevail, the increased sense of aesthetics further increases user satisfaction (Moshagen & Thielsch, 2010). This study suggests that:

H9a: Playfulness mediates the confirmation and user satisfaction relationship

H9b: Aesthetics mediates the confirmation and user satisfaction relationship

2. Method

2.1 Respondents Characteristics

An online self-administered questionnaire was designed according to the constructs incorporated in the conceptual model (see Figure 1). A pilot test among 36 female grocery app users was conducted to achieve content and face validity, while all scale items were adopted from extant literature. Confirmation as well as continuance use intention were adapted from Bhattacharjee (2001). Playfulness as well as aesthetics were adapted from Mathwick et al. (2001). Perceived usefulness was adapted from Davis et al. (1989). Satisfaction was derived from Oliver (1981), and user experience was adapted from Zhou et al. (2007). The first page of the online self-administered questionnaire required respondents' consent; thereafter, some screening questions were provided to ensure the respondents met the characteristics of the sample of interest.

2.2 Sampling Procedures

As a result, this study recruited participants using a purposive sampling technique, and the questionnaire was distributed using QuestionPro platform. Data was collected in two months.

2.2.1 Sample Size, Power, and Precision

314 valid questionnaires were obtained. A 69% response rate was achieved, allowing the researcher to proceed with data analysis.

2.2.2 Measures and Covariates

PLS-SEM was used to test the direct and indirect relationships using the latest version of SmartPLS. Kock and Hadaya (2018) propose that, based on the inverse square root method, the PLS-SEM technique can be applied on a minimum sample size of 160, thus justifying the appropriate sample size of this study.

2.2.3 Research Design

The descriptive research design was deemed applicable for this study. Considering that a quantitative research approach was applied, which aligns with a descriptive research design.

3. Results

3.1 Demographic Results

Demographically, since this study was focused on females, 100% of the respondents were female grocery app users, from the age group of 18–25 (55%), 26–34 (24%), and 35 and above (21%). Most respondents had a bachelor's degree (78.2%), followed by a master's degree or above (12.4%), and high school graduates or below accounted for only 9.4%. Close to 58% of the respondents had a monthly income of more than 25,000 (Rands). The frequency of using the app was 2 to 3 times a week (40.1%), 4 to 5 times a week (15.2%), 2 to 3 times a month (10.4%), 4 to 5 times a month or more (34.3%).

To assess the common method bias, the Harman one-factor test was applied. The findings showed that the single-factor variance was less than 50% and that only about 18% of the total variation could be ascribed to a single factor (Akram et al., 2024). Kurtosis and Skewness tests for data normalcy produced results within the recommended range of ± 1 . Multicollinearity was examined using the variance inflation factor (VIF) test, and the predictor factors' VIF values were all less than 3. As a result, the empirical data did not show signs of common procedure bias.

3.2 Outer Model Results

See Table 1, wherein a confirmatory factor analysis was conducted to determine the measurement model. The results confirm that the measurement model fits well with the accepted fit indices of Chi-square (X^2/df) = 2.228, NFI = 0.936, RMSA = 0.035, CFI = 0.9, TLI = 0.920, RFI = 0.904, and IFI = 0.945, and aligning with recognised norms (Hair et al., 2019). Construct reliability was used to evaluate the constructs' composite reliability and Cronbach's alpha, whilst the homogeneity of the constructs was examined using convergent validity and average variance extracted (AVE). The results in Table 1 show that factor loading values exceeded the threshold value (>0.70) and ranged from 0.715 to 0.892. Composite reliability ratings varied between 0.843 and 0.899 (>0.6), AVE values ranged between 0.601 and 0.737 (>0.5) and Cronbach's alpha values ranged between 0.794 and 0.886 (>0.70), and all values are within the recommended thresholds (Hair et al., 2019).

Table 1. Outer model results

	Factor loadings	Composite reliability	Av extracted variance	Cronbach alpha
Confirmation (CON)		.864	.601	.798
Con1	0.838			
Con2	0.888			
Con3	0.771			
Con4	0.753			
Playfulness (PL)		.893	.761	.803
PL1	0.829			
PL2	0.794			
PL3	0.825			
PL4	0.887			
PL5	0.715			
Aesthetics (AE)		.915	.639	.882
AE1	0.813			
AE2	0.793			
AE3	0.754			
AE4	0.892			
Perceived usefulness (PU)		.843	.649	.854
PU1	0.787			
PU2	0.840			
PU3	0.817			
PU4	0.791			
Satisfaction (SAT)		.86	.682	.794
SAT1	0.844			
SAT2	0.860			
SAT3	0.796			
SAT4	0.843			
Continuance use (CU)		.899	.737	.886
CU1	0.863			
CU2	0.765			
CU3	0.779			

Description: The overall factor loadings, composite reliability, AV variance and Cronbach alpha results

Discriminant validity was confirmed by applying the Heterotrait-Monotrait (HTMT) Ratio test when it was discovered that each construct's squared root of AVE was higher than the inter-construct correlation's absolute value, as shown in Table 2.

Table 2. Discriminant validity

	CON	PL	AE	PU	SAT	CU
CON	.884					
PL	.413	.791				
AE	.459	.647	.834			
PU	.558	.526	.545	.869		
SAT	.468	.515	.143	.258	.843	
CU	.096	.368	.116	.216	.228	.788

Description: The discriminant validity results.

Thereafter, PLS-SEM was applied to test the direct effect and indirect effects of the research model, presented in Tables 3 and 4, respectively.

3.3 Inner Model Results

Table 3. Direct path results

Hypotheses	Path	β	t-Statistics	p-Values	Outcome
H1	SAT \rightarrow CU	0.287	5.159	0.000	Supported
H2	PU \rightarrow CU	0.190	7.918	0.004	Supported
H3	PU \rightarrow SAT	0.171	2.064	0.000	Supported
H4	CON \rightarrow PU	0.436	3.717	0.007	Supported
H5	CON \rightarrow S	0.258	2.935	0.000	Supported
H6a	CON \rightarrow PL	0.183	2.685	0.002	Supported
H6b	CON \rightarrow AE	0.294	8.721	0.018	Supported
H7a	PL \rightarrow SAT	0.175	3.459	0.000	Supported
H7b	AE \rightarrow SAT	0.492	6.539	0.000	Supported

Description: The direct relationship results with SAT = Satisfaction, CU = Continuance use, PU = Perceived usefulness, CON = Confirmation, AE = Aesthetics, PL = Playfulness

All the proposed direct relationships were supported. The direct hypotheses empirical results support H1 to H7b. SAT had a positive and significant effect on CU (H1: $\beta = 0.287$, $p < .000$), PU had a positive and significant effect on CU (H2: $\beta = 0.190$, $p < .004$), PU also had a positive and significant effect on SAT (H3: $\beta = 0.171$, $p < .000$), C had a positive and significant effect on PU (H4: $\beta = 0.436$, $p < .007$), C also had a positive and significant effect on SAT (H5: $\beta = 0.258$, $p < .000$), C further had a positive and significant effect on PL (H6a: $\beta = 0.183$, $p < .002$), C had a positive and significant effect on AE (H6b: $\beta = 0.294$, $p < .0018$), PL had a positive and significant effect on SAT (H7a: $\beta = 0.175$, $p < .000$) and finally AE had a positive and significant effect on SAT (H7b: $\beta = 0.492$, $p < .000$).

Table 4. Mediation and Moderation results

Hypotheses	Path	β	t-Statistics	p-Values (Sig)	Outcome
Mod H8a	UX \rightarrow PL \rightarrow SAT	0.086	0.927	$p < .001$	Supported
Mod H8b	UX \rightarrow AE \rightarrow SAT	0.332	5.145	$p < .001$	Supported
Med H9a	CON \rightarrow PL \rightarrow SAT	0.206	1.367	$p > 0.547$	Not supported
Med H9b	CON \rightarrow AE \rightarrow SAT	0.187	7.819	$p > 0.687$	Not supported

Description: The indirect relationship results with UX = User experience, SAT = Satisfaction, CON = Confirmation, AE = Aesthetics, PL = Playfulness

Moderation analysis was conducted by applying Model 14 from the PROCESS macro process. Bootstrapping the effects 5000 times to yield interaction terms and associated 95% confidence intervals (Hayes, 2018). All the moderation relationships were assigned standardised values, and the interaction variable values were verified. Table 4 presents that UX has a significant moderating relationship between PL and SAT (H8a: $\beta = 0.086$, $p < .001$). Likewise, UX has a significant moderating effect on AE and SAT (H8b: $\beta = 0.332$, $p < .001$). Resultantly, the continuance use intention of grocery apps by female consumers was dependent on the level of their user experience. However, the mediation of the decomposed hedonic values on the confirmation of expectations and satisfaction was not supported. This study applied the transmittal approach in applying the mediation tests as recommended by Rungtusanatham et al. (2014). The assumption is that M (aesthetics and playfulness) serves as variables that mediate the relationship between X (confirmation) and Y (user satisfaction) (Baron & Kenny, 1986) Therein, the bootstrapping method with 5000 subsamples was used to calculate the 95% bias-corrected confidence interval in the indirect relationship using Model 4 from the

PROCESS macro (Hayes, 2018). The empirical findings demonstrated that playfulness and aesthetics both had no mediating effect on the confirmation-satisfaction relationship. (H9a: $CON \rightarrow PL \rightarrow SAT$; $\beta = 0.206$, $p > .547$, $t = 1.367$) and (H9b: $CON \rightarrow AE \rightarrow SAT$; $\beta = 0.187$, $p > .687$, $t = 7.819$). Hence, female grocery app users' perceived confirmation of expectations and satisfaction were not contingent on the hedonic values derived from using the grocery app.

4. Discussion

The main goal of this study was to ascertain the precursors of female grocery app user continuance use intention. Of importance was determining the mediating role of the decomposed hedonic value (aesthetics and playfulness) on the confirmation-satisfaction relationship, as well as the moderating role of user experience on the decomposed hedonic value-satisfaction relationship. The first proposed relationship of H1 was found to be positive and significant, demonstrating that when female grocery app users are satisfied with the grocery app they will eventually continue using the grocery app. This finding is in line with (Amoroso & Lim, 2017; Daneji et al., 2018; Fernandes & Barfknecht, 2020), who found that satisfaction significantly and positively influences continuance use intention. Furthermore, the findings are consistent with the ECM as postulated by Bhattacharjee (2001). Satisfaction also appeared as the strongest predictor of continuance intention than perceived usefulness. This is particularly interesting because the results are aligned with the original ECM, in which satisfaction also predicted continuance use intention more strongly than usefulness. This research's findings support H2, which aligns with the ECM, that usefulness significantly and positively influences continuance use intention. The results of H2 being supported conform to the findings of prior studies (Chabata et al., 2024; Ferreira et al., 2023). Interestingly, the strength of the relationship between perceived usefulness and continuance use intention is slightly stronger in the present study ($\beta = 0.190$) than in the original ECM study. Subsequently, perceived usefulness was found to influence satisfaction (H3), which aligns with prior studies that obtained similar results (Kalinić et al., 2021; Kar, 2021). Though the strength of the H3 relationship is slightly weaker in the present study ($\beta = 0.171$) than that in the original ECM ($\beta = 0.294$), this needs further investigation. H4, H5, H6a as well as H6b were also found to be supported, meaning that confirmed expectations in using grocery apps by female consumers significantly influenced their perceived usefulness, user satisfaction, playfulness and aesthetics, respectively. It can be noted that perceived usefulness in using grocery apps is determined by confirmed expectations, which aligns with studies of (Hossain et al., 2021; Park, 2020; Tam et al., 2020). Similarly, user satisfaction of the grocery app is determined by confirmed expectations, conforming to the initial findings of the ECM as well as Baig and Yadegaridehkordi (2025).

In addition, hedonic value attributes were also determined by confirmed expectations which are supported by previous studies (Chabata et al., 2024; Harmon-Jones & Mills, 2019; Wang et al., 2010). The support for H6a and H6b imply that, if female grocery app users' expectations of the grocery app experience are confirmed, they will find it to be aesthetically pleasing and accommodate its playfulness. Therefore, the playfulness and aesthetics of the grocery app seem to be enhanced when the confirmed expectations are in existence, which one would have only expected such results to be aligned only with utilitarian value. H7a and H7b were also supported; meaning the decomposed hedonic value attributes influence user satisfaction. User satisfaction is enhanced by the presence of an aesthetically pleasing grocery app and one that provides playful attributes. The findings for H7a are in accordance with those of (Fauzi & Sheng, 2021; Oyibo & Vassileva, 2021). While the findings of H7b echo the same outcomes of previous studies (Lindgaard & Dudek, 2003; Oghuma et al., 2016; Szymanski & Hise, 2000; Wang et al., 2010). Remarkably, aesthetics had a stronger impact on user satisfaction ($\beta = 0.492$) than playfulness ($\beta = 0.175$). The more hedonic value that the grocery app offers to female users, the higher it elevates their user satisfaction (H7a and H7b). Thus female grocery app users will have concluded that their satisfaction in using the grocery app is hinged on the fact that they feel the app's interface is appealing and enjoyable to use.

Furthermore, this study revealed that user experience moderated the hedonic value and satisfaction relationship (H8a and H8b). These findings are a key contributor to the literature, which is sparse (Iranmanesh et al., 2022; Long & Suomi, 2024; Tandon et al., 2021). UX was shown to be an important factor in building a strong hedonic value and user satisfaction. The overall UX is crucial when using grocery apps as it enables female consumers to search, find, and engage with the app effortlessly. Aesthetics and playfulness of the grocery app both enhance user satisfaction, which is also enhanced by the user's experience in using the grocery app. The novel and primary contribution of this study is validated by the moderating significance of the impact that user experience has on the decomposed hedonic value elements influencing grocery app user satisfaction.

Contrary to the mediation results, app playfulness had no significant impact on female consumers' grocery app confirmed expectations and that of user satisfaction (H9a) and that of the app's aesthetics mediating confirmed expectations and that of user satisfaction relationship (H9b), which is in accordance with the findings of Chabata et al. (2024). Unfortunately, the findings of this study mean that the decomposed hedonic values are not a crucial factor in the confirmation and user satisfaction. What remains important for female grocery app users is that their user satisfaction is hinged on their confirmed expectations in the absence of decomposed hedonic value elements.

4.1 Theoretical Implications

Firstly, this study extended the original ECM by incorporating decomposed hedonic values as mediators and user experience as a moderator for the first time among female grocery app users continuance use intention. Through the incorporation of novel mediators and moderator, this study asserted a more predictive power, since a significant variance (48%) was obtained, which is slightly higher than the original ECM, which had a predictive power of only 41% (Bhattacharjee, 2001).

Secondly, this study made a unique contribution to the mobile app literature by not only being the pioneer to extend the ECM comprehensively with the incorporation of UX moderating the decomposed hedonic values and satisfaction relationship, but validating the empirically tested relationship in an emerging market and mobile app post-adoption literature (Akram et al., 2024; Hou & Elliott, 2021; Lyu et al., 2024). The role of UX is crucial in ensuring that ECM can be enhanced with a validated moderating effect.

Thirdly, in the original ECM, confirmation and perceived usefulness served as the only explanatory variables of user satisfaction; although the decomposed hedonic value attributes did not mediate the confirmation-satisfaction relationship, this study proved that decomposed hedonic value (aesthetics and playfulness) are crucial explanatory variables of user satisfaction within a grocery app context. As a result, a novel contribution to literature has been established by proposing decomposed hedonic value as essential variables that could not only explain, but also increase, the predictive power of user satisfaction in the ECM. Lastly, the findings in this study support the basic constructs of the ECM model, such as confirmation impacts perceived usefulness as well as user satisfaction. The alignment to the origins of the ECM by Bhattacharjee (2001) strengthen the established relationships in a grocery app context.

4.2 Managerial Implications

Retailers and policymakers should focus on the app's aesthetics to better influence user satisfaction, which will further result in the continuance use intention of grocery apps among female users. It stands to reason that the look and feel of the app is crucial; hence app developers should understand various design elements that will interest users, from the color themes and the interface navigation panels, among others. Not forgetting that grocery app designers should build user-pleasing apps, as such is imperative to user satisfaction. The inclusion of gamification based on the products offered by a retailer would amplify the joy in using the app, which will further increase user satisfaction levels. Additionally, to achieve continuance use intention, developers should focus on increasing users' perceptions of the usefulness of the app, to further increase satisfaction levels, and enhance the apps hedonic value in the form of aesthetics as well as playfulness.

Moreover, practitioners could concentrate on boosting viral marketing communication initiatives through social media or online reviews that enable users to share how useful and satisfied they are in using the grocery app with friends and family. Thus, grocery app providers could introduce attractive loyalty programs that encourage consumers to perceive the app to be useful in that they can redeem rewards and discounts that satisfy their app usage experience.

However, as much as the hedonic value elements did not mediate the confirmation-satisfaction relationship, practitioners should consider the unique role that hedonic value understudy directly plays in influencing grocery app user satisfaction. Policymakers can implement policies that are not stringent in making apps that allow for better customisation of features, enabling users to maximise preferences, such as allowing customers to choose their preferred grocery services, stress reduction features, bargain shopping, allowing for more interaction and app games among other features. Marketing campaigns should zoom in on highlighting the hedonistic benefits of using the grocery app as this is crucial in raising user satisfaction levels. Providing these attributes in the grocery app can encourage users to keep using it.

5. Conclusion

This study contributed both managerially and theoretically to the body of knowledge in mobile app continuance use. Perceived usefulness and decomposed hedonic value through user satisfaction are significant drivers of grocery app continuance intention among female shoppers, with user satisfaction having the strongest influence on continuance use intention. Though decomposed hedonic value did not mediate the confirmation-satisfaction relationship, aesthetics and playfulness had a significant effect on user satisfaction, with aesthetics exerting a stronger impact on user satisfaction than playfulness. The utmost contribution of this study was validating the moderating role of UX on the decomposed hedonic value-user satisfaction relationship. Despite the much-considered contributions, some limitations are acknowledged, which can pave the way for future study directions. Starting with this study focusing only on female grocery app users in a cross-sectional study, yet consumer behaviour changes over time and would require a longitudinal study to be considered. Data was also collected using a non-probability purposive sampling technique, meaning the results cannot be generalised to other regions with different female shopping cultures or traditions. Other factors can be considered, such as the adoption of probability sampling techniques as well as comparative studies to enable better generalisation of the results. Future studies can apply a mixed-methodology research approach, use interviews or focus

groups. This study collected data from experienced users of grocery apps. An interesting future study area could repurpose the same model by incorporating the moderation of novice versus experienced app users, as purported by Liébana-Cabanillas et al. (2016).

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Authors contributions

Dr TTC developed the manuscript, read and approved the final manuscript.

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The author declares that there are no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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The data that support the findings of this study are available on request from the corresponding author. The data are not publicly available due to privacy or ethical restrictions.

Data sharing statement

No additional data are available.

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