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Modelling mobile advertising, consumer response and mobile shopping behavior. A post COVID-19 pandemic perspective

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ABSTRACT

This study investigated the impact of five mobile advertising strategies on consumer attention and interest to bolster mobile shopping. The study aimed to promote and enhance mobile shopping acceptance and usage. The stimulus-response of consumer attention and interest was modelled to directly impact the intention to use mobile shopping, whilst mobile shopping intention predicts actual mobile shopping. The AIDA model of consumer decision-making and the technology adoption model informed the study. Data for the study were collected from participants in Harare, Zimbabwe, using a structured questionnaire. The study validated 211 responses, which were analysed using a structural equation modelling technique (SEM). The study confirmed the importance of mobile shopping for consumer engagement and recommended enhancing mobile advertising to boost attention and interest, thereby increasing mobile shopping.

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1. Introduction

The COVID-19 outbreak prompted a revolution toward online-based marketing to bridge the communication gap caused by measures implemented to contain the pandemic. Globally, restrictions on controlling the spread of the pandemic, such as lockdowns, controlled movements, and the promotion of remote servicing, forced a shift from physically interactive shopping towards online shopping. In the process, consumers adapted to the use of mobile gadgets (m-commerce) for their transactions (Akanferi et al., 2022), which triggered a new paradigm shift in consumers' decision-making processes and shopping behaviours, defined by avoiding social interactions with online acquisitions, home deliveries, and contactless payments (Vinerean et al., 2022). This change naturally necessitated marketers to keep track of these new consumer shopping trends to develop fitting strategies. As Gregurec et al. (2021) argued, businesses embraced a rapid paradigm shift in marketing goods and services from physical to virtual platforms to keep up with the changing landscape. Thus, COVID-19 enforced a dyadic adaptation towards mobile e-commerce for advertisers, underpinned by greater use of mobile advertising channels, while consumers further embraced mobile commerce-aligned shopping behaviours.

Mobile commerce during the pandemic was an unplanned and reactive strategy (Makudza et al., 2022). The pandemic presented many challenges to informal trading. For example, most mobile

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advertising strategies fail to get the desired consumer attention and stimulate consumer interest (Masengu et al., 2022). That further stifled efforts to promote effective mobile shopping in emerging economies. Statista (2023) notes that Zimbabwe has a low mobile e-commerce acceptance rate of 26.8% against a global average of 57.6%. Compared to the average of 1.3% for Africa in 2020, Zimbabwe's digital expenditure as a percentage of consumer spending per capita was small at 0.3% (Tradegov, 2024, p. 2). Although less than 27% of consumers use mobile e-commerce, the infrastructure that supports it is estimated to have improved by 39% (Techzim, 2022). The adoption of a mobile commerce ecosystem requires a widespread usage of smartphones. Worrisomely, only 58.8% of the 89.6% of homes with mobile phones, however, have smartphones (POTRAZ, 2021). Research on mobile advertising, consumer attention, and mobile shopping in Zimbabwe remains underdeveloped. Some earlier studies have become outdated (Chitungo & Munongo, 2013; Chiumbu & Nyamanhindi, 2012), while others indirectly address mobile advertising and consumer shopping behaviour (Mupfiga & Padare, 2017; Makudza et al., 2020). The underdevelopment in this domain presents empirical, theoretical, and practical gaps in understanding how consumers react to commercials on mobile phones, how they behave after being exposed to mobile phone advertising stimuli, and their ultimate mobile shopping behaviour.

This study aimed to address the identified gaps by constructing and validating a mobile shopping model that examines consumers' adaptation in the Zimbabwean market to mobile commerce during and after the COVID-19 pandemic. Thus, the study's main objective was to model the impact of mobile advertising channels on consumer attention, interest, and shopping behaviour. The study makes a unique contribution by testing the efficacy and significance of mobile advertising strategies that the informal sector in Zimbabwe has been using: app-based mobile advertising, in-game mobile advertising, mobile search advertising, SMS and social media advertising. The direct consumer response to mobile advertising was linked to consumer interest and attention, which were further linked to mobile shopping intention and actual shopping behaviour. The study further had a methodological impact by testing the model in Zimbabwe, a milestone never achieved.

This study thus makes several theoretical and empirical contributions to the literature on mobile advertising and shopping behaviours. Firstly, this study is one of the few from a low technology penetration context that examines and sheds perspectives on mobile advertising and shopping behaviours. Secondly, the post-COVID-19 context foregrounds a research context that enables comparisons in consumer shopping behaviour responses to mobile advertising with the pre-and during COVID-19 trends. Thirdly, our findings offer novel insights into the efficacy and significance of mobile advertising strategies in African economies. These reflections are essential for adding an African voice and representativity to global marketing literature.

The structure of this article is: the introduction is followed by a literature review of literature on mobile advertising, consumer behavioural variables, and mobile shopping, which also outlines the study hypotheses. The third part describes the methodology applied, followed by data analysis, discussion, conclusions, implications and limitations.

2. Literature review

2.1. Mobile advertising

In the ever-evolving marketing landscape, consumers face a complex decision-making process of selecting what to purchase, where, and how to find the product (Dellaert & Häubl, 2012). With a plethora of sources from which to choose and different methods of promotion, mobile advertising has become a powerful and impactful factor in influencing consumer purchasing decisions because of its ability to tailor messages to specific individuals and interact with users at different points in their buying process (Bart et al., 2014). Mobile advertising refers to the transmission of information by advertisers to users through cell phones or other wireless communication devices (Hsu et al., 2023). It uses various formats such as graphics, text, music, or videos to reach advertisers' goals. One advantage of mobile advertising is its ability to provide targeted and personalized customer messages based on location, interests, and behaviour. It also enables consumers to access advertising messages conveniently (Murillo-Zegarra et al., 2020). With geolocation features and data analytics, companies can tailor their campaigns to specific

audiences and increase the likelihood of engagement (Makudza et al., 2020). Research further reveals that mobile ads thematically relevant to the consumer's present location and goal lead to more purchases than those not congruent with the location (Liu-Thompkins, 2019). To ensure the success of mobile advertising, trust should be established between the advertiser and the customer to eliminate the risks associated with online buying (Lăzăroiu et al., 2020). Accordingly, companies that adopt mobile advertising should endeavour to build a reputation of trust amongst their online consumers. Behavioural outcomes like shares, clicks, and purchases to mobile advertising depend on a complex interplay of advertising goals, advertising elements, consumer, firm, market, and context factors (Shankar, 2016).

Regarding its capabilities to influence consumer buying decision-making processes, mobile purchase decisions are a result of the customer's cognitive processes (Hu et al., 2020). Consequently, mobile advertising allows businesses to reach their audience at multiple touchpoints throughout the customer journey, from initial awareness to post-purchase follow-up (Mahapatra, 2017). This journey is influenced by such factors as social influence, trust and the reputation of the advertiser, which play a pivotal role in modifying behavioural intention toward online purchases (Lăzăroiu et al., 2020). Advertisers leverage diverse mobile advertising channels to reach users actively seeking products or services related to their offerings, increasing the likelihood of purchase intentions and actions (Murillo-Zegarra et al., 2020). Such channels embrace video ads that can showcase product demonstrations or brand stories and social media platforms with sponsored content and influencer endorsements. Furthermore, mobile apps offer enticing experiences like gamification and interactive storytelling that increase consumer engagement and build conviction and loyalty (Truong, 2023). With its targeted and personalized messaging based on location, interests, and behaviour, mobile advertising is a powerful tool for businesses to influence consumer buying decision-making processes at multiple touchpoints throughout the customer journey, increasing the likelihood of purchase intentions and actions. It is essential, however, to note that mobile purchase decisions result from the customer's cognitive processes (Hu et al., 2020). Moreover, the purchase decisions are influenced by social influence, trust and the advertiser's reputation. These are pivotal in modifying behavioural intention toward online purchases (Lăzăroiu et al., 2020). Including testimonials from satisfied customers is an alternative way companies can use to modify customers' behavioural intentions (Briñol et al., 2004).

2.1.1. Types of mobile advertising

Mobile advertising encompasses various strategies, including app-based mobile advertising, in-game mobile advertising, SMS mobile advertising, and social media advertising. Each approach is a vital component of the mobile marketing landscape, tailored to engage users across different platforms and contexts. App-based mobile advertising pays application developers to place advertisements inside their mobile apps (Murillo-Zegarra et al., 2020). This aids publishers in maintaining their content's accessibility to users and encourages downloads while generating quickly expandable funds. Apps influence smartphone usage and worldwide access to media, which further enhances user exposure to in-app ads (Gao et al., 2022). Hussain et al. (2022) state that in-game mobile advertising relates to selling ad space within game applications. Although in-game advertising comes in various styles, they all aim to attract attention while preserving the player's game experience. Makudza et al. (2020) note that short messaging service (SMS) advertising is a type of advertising companies employ to text promotions to clients. Typically, it uses 160 characters to send a commercial in one text message, which indicates the need for marketers to be brief and to the point when using SMS advertising. Social media advertising is another type of mobile advertising whereby companies advertise their products on users' social media platforms, which are accessible on mobile phones (Masengu et al., 2022). The mobile advertising strategies discussed above offer unique ways to connect with users, maintain accessibility, and promote products or services while respecting the dynamics of various mobile environments.

2.2. Consumer attention and interest

Consumer attention and interests are two related terms that show consumers' responses to a marketing stimulus (Manafe & Pramita, 2022). Consumer attention relates to subliminal and intentional recognition

and acknowledgement of commercials (Makudza et al., 2020). Once consumers have paid attention to an advert, they are more likely to develop an interest in the commercial by relating it to their personal needs (Manafe & Pramita, 2022). A well-structured and conspicuous commercial is more likely to attract consumers' attention. Consumer attention and interest help marketers go beyond selective distortion and selection blockage of communication (Salem et al., 2022). Attention-and-interest-grabbing commercials raise both the differential and absolute threshold, thus increasing a commercial's effectiveness (Makudza et al., 2020). Thus, attention and interest are critical in marketing.

Consumer attention and interest concepts are premised in the AIDA model. The AIDA model conceptualizes advertising's impact on consumer behaviours as a series of events from Attention, Interest, and Desire to taking Action (Manafe & Pramita, 2022). In practice, broader interpretations suggest the AIDA model focuses on consumer purchase decision-making processes (Holden & Mwakyusa, 2023; Matanhire et al., 2021) by measuring the steps of the purchase decision (Purbaningsih et al., 2022) and classifying the various responses a customer may have to an advertisement (Djubair & Ming, 2022). The model suggests that effective advertising starts by drawing consumer attention, which matures into interest and leads to desire, convincing consumers to purchase (Matanhire et al., 2021). Therefore, consumer attention and interest are pivotal in the buyer's decision-making process.

In line with a systematic analysis of research published between 2018 and 2021 focusing on mobile commerce, mobile shopping apps and mobile payment devices, Andronie et al. (2021) concluded that the purchase decision-making process in mobile app-based retailing influences customers' assumptions and stipulations. The consumer's commitment and eagerness to embrace mobile commerce apps are determined by their behavioural intention and adoption.

2.3. Mobile shopping and mobile shopping intention

Mobile shopping involves buying goods and services using a mobile phone (Groß, 2015). Mobile shopping allows customers to browse, find, and buy products online using their smartphone or tablet (Lee et al., 2017). Customers can purchase using one of three platforms while using a portable shopping device: a website, an app, or a native app. Mobile users make purchases directly from a brand's e-commerce website when making purchases via a website. Customers can also use a brand-specific or native app, such as one from Google Play or the Apple App Store, to find products (Groß, 2015). By enabling consumers to access and buy things wherever they are without requiring a desktop or in-store experience, mobile shopping elevates convenience to a new level (Lee et al., 2017). Mobile shopping intention, on the other hand, relates to a consumer's intention to shop using mobile devices (Chen et al., 2018). This typically happens to consumers who have never used mobile shopping but have been stimulated. The concept of intention was influenced by the TAM model, which is employed as a theoretical framework to examine the users' acceptance and adoption of technology. The model proposes that technology acceptance influences the intention to use the technology in the future (Makudza et al., 2021; Murillo-Zegarra et al., 2020). Hofacker et al. (2016) suggest that there has been a significant increase in the worldwide interest and willingness to shop on mobile phones. Consistent with the TAM propositions, this broad acceptance of mobile phones as part of everyday life promotes the intention to use mobile shopping (Makudza et al., 2021).

2.4. Mobile advertising and consumer attention and interest

2.4.1. Impact of app mobile advertising on consumer attention and interest

Previous studies on app-based mobile advertising noted that this form of advertising has gained traction in recent years due to its ability to reach target audiences with personalized messages. It has also been found that app-based mobile advertising positively impacts consumer attention and purchase intention by increasing their engagement with ads and developing brand interests (Murillo-Zegarra et al., 2020). Using interactive features such as gamification and video storytelling in mobile advertisements can enhance consumers' cognitive processing of the ad message and improve memory retention (Ghosh et al., 2022). Furthermore, app-based mobile advertising can influence consumer interest by creating a more immersive and engaging user experience. An empirical study examining how augmented reality

affects advertising effectiveness found that mobile advertising apps created a more favourable attitude toward the ad, resulting in higher engagement. However, Alwreikat and Rjoub (2020) mention other studies that found a negative effect of mobile advertising strategies on consumer behaviours due to consumer irritation and perceived intrusiveness. Despite these findings, we theorize that a positive correlation exists between exposure to app-based advertising and increased consumer interest in the advertised products.

H_1: App-based mobile advertising positively affects consumer attention.

H_2: App-based mobile advertising positively affects consumer interest.

2.4.2. Impact of in-game mobile advertising on consumer attention and interest

Like other mobile advertising channels, in-game mobile advertising has emerged as a promising platform for reaching and engaging consumers. There was a notable surge in gaming across the globe during the COVID-19, as customers used games to escape and socialize (Mishra & Malhotra, 2021), thereby providing advertisers with an opportunity to leverage the power of in-game mobile advertising to impact consumer attention and interest. Studies have found that in-game advertising has positive effects on increasing consumers' exposure to brands (García-Jurado et al., 2021), and positive effects improve their recall of ad messages and even boost their purchase intentions (Vashisht et al., 2020). Rialti et al. (2022) explored the relationship between gamified advertising and in-app purchases and found that in-app advertising experiences positively impacted in-app purchases through a series of effects from catching attention, developing interests and purchasing decisions. As Vashisht et al. (2020) further highlighted, in-game advertising creativity and interactivity enable consumers to build positive emotional responses linked to greater attention, engagement and interest towards the advert. In-game advertising can be highly targeted based on gaming behaviour, demographics, and geolocation, enhancing its effectiveness. However, in their scoping systematic review of related literature on the impact of interactive advertising on consumer engagement, recall, and understanding, Giombi et al. (2022) found mixed results on the effect of mobile advertising channels on in-game mobile advertising on consumer attention and interest. Mishra and Malhotra (2021) similarly reported a proliferation of mixed findings in existing studies regarding the impact of in-game mobile advertising and gamification on consumer behaviour. Literature, therefore, reflects conflicting opinions about the net effect of the impact of in-game mobile advertising on consumer attention and interest. Nonetheless, based on this existing body of research, we hypothesize that:

H_3: In-game mobile advertising positively affects consumer attention.

H_4: In-game mobile advertising positively affects consumer interest.

2.4.3. Impact of SMS mobile advertising on consumer attention and interest

While there have been mixed results concerning the effect of SMS mobile advertising on consumer attention and interest, advertisers have continued to utilize the SMS mobile advertising strategy. Operationalizing SMS adverts is believed to be easy, cost-effective and result-oriented (Kumar & Mittal, 2020). Siraj et al. (2021) attribute consistent and increasing usage of SMS advertising to the fact that people carry their mobile phones everywhere, allowing marketers to connect with their potential customers directly. Moreover, this trend is buttressed by research evidence suggesting that consumers respond well to SMS adverts (Makudza et al., 2020), notwithstanding perceptions that consumers detest SMS ads because they are intrusive and irritating (Uddin et al., 2019). Results from a study by Makudza et al. (2020) in Zimbabwe, which explored the differential impact of bulk text message advertising on consumer attention, confirmed that text messaging significantly impacted consumers' attention. This finding concurs with that of Holden and Mwakyusa (2023), who later examined the influence of SMS advertisements on purchase intentions by mobile telecommunication consumers in Tanzania and found that consumers' interest in SMS advertisements has a significant and positive influence on purchase

intention. Other persuasive views assert that entertaining SMS adverts draws attention and arouses interest (Siraj et al., 2021), suggesting that SMS has an important contribution to the intention of that consumer to purchase.

H_5: SMS mobile advertising positively affects consumer attention.

H_6: SMS mobile advertising positively affects consumer interest.

2.4.4. Impact of social media advertising on consumer attention and interest

In the rapidly evolving digital era, social media platforms have become prominent spaces for advertising, captivating a vast audience (Masengu et al., 2022). On social media, consumers can look at their newsfeeds and shift their gaze between different elements, with some elements being seen while others are not (Janiszewski, 1993). The impact of competition on consumers has been difficult to measure and quantify, as consumers themselves are changing along with advertising methods (Dangaiso et al., 2023). However, the extent to which these advertisements effectively capture consumer attention and pique their interest remains a critical question. A study on a Chinese population found that consumers avoid adverts once they feel invaded (Niu et al., 2021); hence, advertisers are cautioned to engage consumers better (Ghosh, 2018). Therefore, the following hypotheses will be investigated:

H_7: Social media advertising positively affects consumer attention.

H_8: Social media advertising positively affects consumer interest.

2.4.5. Impact of mobile search advertising on consumer attention and interest

Mobile search advertising has the potential to significantly influence consumer attention and interest, as it tailors advertisements to consumers' past search histories. Mobile search advertising may significantly impact consumer attention, and interest since the advert's consumer wants are tailored to suit their previous search history. Consumer attention and interest are also evolving, and their impact is not fully appreciated. Mobile search advertising can be tailored to be eye-catching, and algorithms can ensure it appears to the right age consumers at the right time based on their search queries and can be personalized to catch users' attention (Smith et al., 2007). However, one of the challenges of mobile search advertising is that audience attention is highly fragmented in mobile environments, requiring brand messages to work hard to make an impact. Considering the preceding, we posit that:

H_9: Mobile search advertising positively affects consumer attention.

H_{10}: Mobile search advertising positively affects consumer interest.

2.4.6. Impact of consumer attention and interest on mobile purchase and purchase intention

Purchase intention denotes the probability consumers will intend or express a willingness to acquire a particular product or service (Wu et al., 2011). In advertising, purchase intention refers to the process by which consumers plan to purchase a product/service due to advertisements delivered through advertising media (Lee et al., 2017). Martins et al. (2019) found that an upsurge in purchase intention enhances the probability of purchasing, highlighting that positive purchase intentions correlate with increased engagement and subsequent purchases.

Teixeira et al. (2012) indicate that attention is a necessary ingredient for effective advertising, and the cost of attention has increased dramatically in the last two decades. Consumer attention and interest do not always translate to sales, as other factors like buying power and need for the product, must be considered. Various studies attribute many reasons to what influences consumer intention to purchase products and services. Such attribution is a result of various theoretical lenses used by scholars. For example, studies that apply Ajzen's (1991) Theory of Planned Behavior believe that purchasing behaviour is influenced by intention, while the intention is influenced by three antecedents, attitudes, subjective norms and perceived behavioural control. In line with the AIDA model, and hypothesized in this study,

mobile purchasing behaviour is influenced by mobile purchasing intention, purchasing intention is influenced by consumer interest, and interest is influenced by attention. The current study hypothesizes that both consumer attention and consumer interest influence intention. Furthermore, the study suggests a mediating role of interest between attention and intention.

H_{11}: Consumer attention positively affects consumer interest.

H_{12}: Consumer attention positively affects mobile shop intention.

H_{13}: Consumer interest positively affects mobile shop intention.

H_{14}: Mobile shop intention positively affects mobile purchases.

Figure 1, therefore, presents the conceptual framework of the study. It shows the hypothesised associations among mobile advertising variables and consumer attention and interest. Further, it presents the links from consumer attention and interest to mobile purchase intention and actual purchase.

3. Methodology

The study adopted a positivist philosophy in which mobile shopping was understood factually and objectively. An explanatory research design was assumed to measure the relationship between mobile shopping advertising, consumer attention, interest, intention and mobile shopping. Data for the study were collected from consumers with mobile smartphones in Harare, Zimbabwe, using a structured 7-point Likert scale questionnaire survey. The targeted group was justified because they were active recipients of mobile marketing and their response was through mobile shopping. The study's context provides valuable insights and lessons that can be applied to mobile marketing strategies in other emerging countries. By studying mobile marketing in Zimbabwe, businesses and other researchers internationally can benchmark their own strategies against those in Zimbabwe. Furthermore, the selected study context helps to identify current and emerging mobile marketing and mobile shopping trends in the region and provides a global perspective of the mobile smartphone industry. The questionnaire constructs were informed by previous conceptualizations of mobile advertising and mobile shopping (Chen et al., 2018; Groß, 2015; Makudza et al., 2020). Data were collected using an in-person-administered survey. The study screened out respondents without prior mobile shopping exposure. The final sample size used in this study was 211. Malhotra and Dash (2011) argue that in framing a research

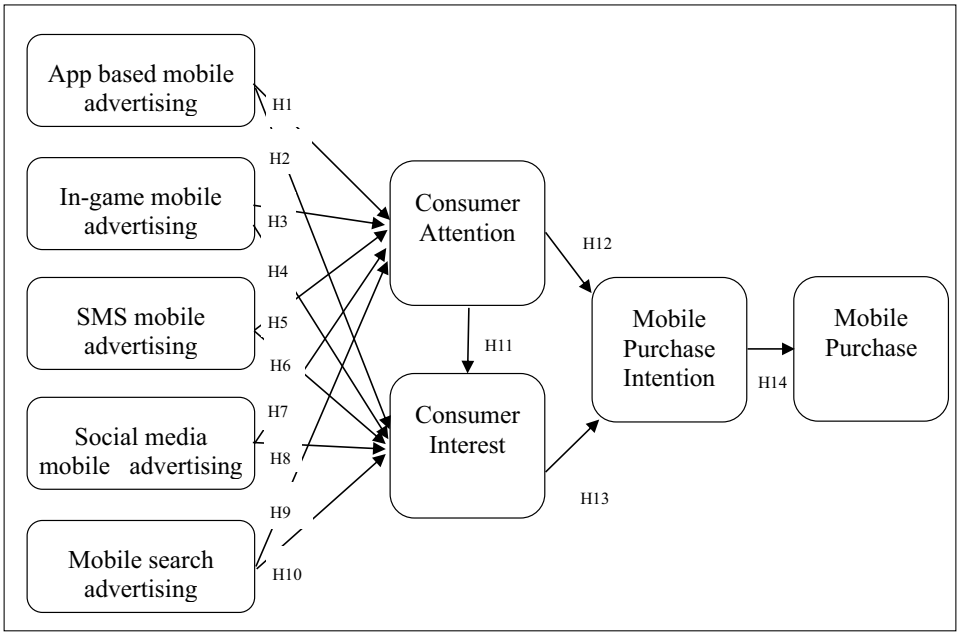


Figure 1. The conceptual framework.

problem to be analysed with factor analysis, the sample size must be at least 5 to 10 times the number of variables in the theoretical model. Thus, with nine variables, a sample size of 211 was higher than expected. Furthermore, Malhotra and Dash (2011) and Wang and Ahmed (2004) argue that where CFA or SEM is employed to validate a scale, a sensible sample size using the maximum likelihood estimation (MLE) method should be a minimum of 200 cases. Reliability was tested using the construct reliability test and the Cronbach alpha test, with a minimum acceptable threshold of 0.70 for both tests. Convergent validity was assessed using standardised factor loadings and average variance extracted (AVE) with an acceptable cutoff of 0.5. The Fornell-Larcker criterion was used to further assess the discriminant validity of the data. This study strove to be ethically sound throughout, whilst data were analysed using IBM-SPSS and AMOS-SEM to test the statistical significance of the relationships. A two-step data analysis process was used where confirmatory factor analysis (CFA) and SEM were applied to the data.

4. Data analysis

4.1. Demographic distribution

The study validated 211 responses from consumers. Table 1 presents the demographic distribution.

The study attracted responses from both males and females, with an almost equal distribution of both genders. Young adults dominated the study with a sampling frequency of 52.6%. This gives an idea of high levels of adoption among young adults compared to the older community members. The response frequency by age decreases with the increase in respondents' age. This implies that age influences mobile shopping usage. Regarding education, the majority were high school graduates, with a frequency distribution of 59.7%. It also shows that frequency diminishes from lower to higher academic qualifications.

4.2. Mobile shopping distribution

The study measured mobile shopping using respondents with prior mobile shopping experience. Table 2 profiles mobile shopping among respondents.

Table 2 shows that most respondents use mobile shopping occasionally (65.4%), whilst 14.2% use it weekly and 7.1% use it daily. These findings show that mobile shopping has been adopted but not fully utilized. However, respondents indicated that mobile shopping is an effective digital commerce platform, confirmed by 78.7%. Only 21.3% were neutral. This indicates that mobile shopping has significant efficacy among consumers.

Table 1. Demographic distribution.

Gender	%	Age	%	Qualification	%
Male	49.8	18–25	52.6	High school	59.7
Female	50.2	26–35	24.2	Certificate	20.9
		36–45	16.6	Degree	16.6
		46–55	6.6	Master's degree	2.8
				PhD	0

Table 2. Mobile shopping distribution.

Frequency of mobile shopping	%
Bi-weekly	4.3
Daily	7.1
Monthly	9.0
Occasionally	65.4
Weekly	14.2
Effectiveness of mobile shopping	**%**
Effective	67.3
Extremely effective	11.4
Neutral	21.3

4.3. Confirmatory factor analysis

In this study, a two-step data analysis process was used. Confirmatory factor analysis (CFA) and SEM were applied to the data. The models in this study were estimated using a maximum likelihood estimation with the variance-covariance matrix (Byrne, 2013). The measurement model was assessed based on several factors. First, the unidimensionality of the standardized factor loadings was checked. Items with weak standardized loadings (less than 0.5) should be removed, according to Hair et al. (2016). Byrne (2013) expounds that loadings below 0.3 are not considered substantial, those above 0.4 can be considered significant, loadings above 0.5 are substantial, and loadings over 0.7 are significant in CFA. Hair et al. (2010) report that loadings of 0.7 or higher in CFA indicate that the measurement model effectively predicts the latent variables. In the CFA model, SMS3 had the smallest standardized loading (0.572), whereas SI7 had the highest standardized loading (0.958) (Table 3). Second, the Average Variance Extracted (AVE) and convergent validity were examined. The criterion for AVE is 0.5, meaning that each component needs not to be less than 50% of the total variance of a construct, and these explain the amount of variation shared by indicators on a latent factor. The requirements of convergent validity were met, as indicated in Table 2, where the variable with the lowest AVE was SMS advertising (0.589), and the highest was mobile shopping intention (0.826). Internal consistency was confirmed by leveraging Construct Reliability (CR) and Cronbach Alpha (CA). The minimum value needed for both methods is 0.7. The latter, however, is suggested in SEM since it takes error variation into account (Hair et al., 2016). Table 3 includes the results for CR and CA and proves the dependability of the measuring scale.

The Fornell–Larcker criterion was used to assess the discriminant validity of the data. Hair et al. (2010) claim that discriminant validity is assured if a pair of variables' common variance is bigger than their average variance extracted (AVE). The findings in Table 4 provide proof of discriminant validity. All shared variances are more significant than the individual AVE. The study concludes that each latent variable was unique and measured its specific characteristics.

The model fit statistics were also within the suitable limits for CFA: RMSEA = 0.064, GFI = 0.945, AGFI = 0.923, and CFI = 0.951. The study's measurement model was validated using model fit statistics that met the acceptable criteria defined by Byrne (2013) and Hair et al. (2016).

4.4. Structural equation modelling

The structural model was evaluated by assessing the model fit (absolute and incremental fit), the importance of the path estimations, and the model's predictive ability (*R* square). These served as the foundation for testing the hypothesized relationships. Figure 2 displays the path diagram.

The model fit statistics assessed for the structural model in Figure 2 were all within the acceptable region: CMIN/DF = 2.97, CFI = 0.910, GFI = 0.902 and RMSEA = 0.068. The coefficient of determination of 0.55 means that the model tested in this study explains mobile shopping by a factor of 55%. Consequently, Table 5 presents the results of the hypotheses. Three hypotheses were not supported, whilst the rest were statistically significant.

4.5. Discussion

4.5.1. The effect of mobile advertising on consumer attention

The first hypothesis (H_1) theorized that app-based mobile advertising positively impacts consumer attention. That association was not supported (β = −082; $P = .124$; T = −1.538). This means that mobile advertising using mobile applications does not stimulate consumer attention. These results diverge from previous studies, which found a positive impact (Ghosh et al., 2022; Murillo-Zegarra et al., 2020). The effect of in-game mobile advertising on consumer attention was also not supported (H_3). The *p*-value of.68 was higher than the accepted alpha value of.05. This means that mobile advertising on smartphone games does not get users' attention. Again, the finding in this study contradicts previous studies which were reviewed (Doğan-Südaş et al., 2023; Rialti et al., 2022; Vashisht et al., 2020). The relationship between SMS advertising and consumer attention found substance with a significant *p*-value of 0.00 ($T = 8.638$) (H_5). A strong positive beta coefficient of 0.527 further proves the importance of SMS advertising to drive

Table 3. Output for the measurement model.

Factor	Item	SFL	CA(α)	CR	AVE
App-based Mobile Advertising (AMA)	My phone can download and install mobile applications of various businesses from sites such as the Play Store.	0.678	0.908	0.914	0.604
	I come across adverts on the applications that I use.	0.798			
	The adverts within an application are catchy.	0.835			
	App-based mobile adverts are simple to understand.	0.895			
	I find app-based advertising to be credible.	0.714			
	I think advertising using an application is informative.	0.742			
In-game Mobile Advertising (IMA)	I play games on my mobile phone.	0.72	0.909	0.912	0.637
	I come across adverts when playing a game on my phone.	0.897			
	The adverts that pop up when playing a game are informative.	0.886			
	In-game mobile adverts are simple to follow.	0.876			
	In-game mobile adverts are credible.	0.707			
	The frequency of advert pop-ups during a game is acceptable	0.667			
SMS Mobile Advertising (SMS)	I receive adverts in the form of an SMS	0.911	0.893	0.894	0.589
	I find SMS adverts to be very credible	0.821			
	I like the frequency with which I receive SMS adverts from the same sender	0.815			
	I think SMS adverts are more credible.	0.572			
	SMS adverts are very informative.	0.764			
	SMS adverts are easy to understand.	0.675			
Social Media Advertising (SMA)	I am exposed to social media adverts through my mobile phone.	0.919	0.932	0.934	0.706
	Social media adverts are more credible.	0.911			
	I am happy with the frequency of new social media adverts.	0.897			
	I perceive social media adverts to be credible.	0.778			
	I easily understand social media adverts.	0.866			
	I like the informativeness of social media adverts.	0.635			
Mobile Search Advertising (MSA)	When I browse the internet using my mobile phone, marketers use my search history to send me adverts related to my previous searches.	0.859	0.947	0.950	0.793
	Adverts based on my internet search history are more informative to my needs.	0.947			
	I can easily follow recommendations of products based on my browsing history.	0.922			
	I think using my previous history to develop an advert is very credible.	0.944			
	The rate at which I am exposed to adverts based on my previous search history is desirable.	0.766			
Consumer Attention (CA)	I read adverts that come through my phone.	0.852	0.912	0.915	0.648
	I read mobile adverts instantly.	0.829			
	I keep mobile adverts on my phone for future use.	0.686			
	I pay attention to adverts that target me personally.	0.582			
	Mobile adverts increase my ability to pay attention to the details of the advert.	0.898			
	I usually analyse thoroughly each mobile advert that I receive.	0.927			

(*Continued*)

Table 3. Continued.

Factor	Item	SFL	CA(α)	CR	AVE
Consumer Interest (CI)	I pay interest to adverts that come through my phone.	0.797	0.928	0.930	0.727
	I am always interested in marketing that targets me directly on my mobile phone.	0.833			
	Personalized mobile adverts stimulate my interest in reading them.	0.928			
	I look forward to receiving new mobile marketing adverts.	0.915			
	Mobile advertisements are interesting.	0.778			
Mobile Shopping Intention (SI)	I intend to use my phone to buy products and services.	0.958	0.969	0.971	0.826
	I wish to pay for goods and services using my phone.	0.921			
	I compare different product offerings using my phone to make an informed purchasing decision.	0.948			
	I wish to shop using my mobile phone.	0.937			
	I intend to encourage friends to buy using mobile phones.	0.778			
	I intend to upgrade my skills in buying and selling using my phone.	0.875			
	I wish to use my phone to buy goods and services with my friends/relatives/ workmates.	0.931 0.958			
Mobile Shopping (MS)	I use my phone to buy products and services.	0.875	0.959	0.959	0.770
	I can pay for goods and services using my phone.	0.879			
	I can compare different product offerings using my phone to make an informed purchasing decision.	0.912			
	I shop using my mobile phone.	0.856			
	I encourage friends to buy using mobile phones.	0.88			
	I have skills in buying and selling using a mobile phone.	0.82			
	I sometimes use my phone to buy goods and services with my friends/relatives/ workmates.	0.917			

customer attention. These results are confirmed by previous studies (Holden & Mwakyusa, 2023; Makudza et al., 2020; Uddin et al., 2019). Social media advertising is also very effective in attracting mobile users (H_7). Social media advertising positively impacts consumer attention (β = 0.455; P = 0.00; T = −7.795). Masengu et al. (2022) also found that consumer attention is enhanced through effective social media infodemic and social media adverts. Similarly, Niu et al. (2021) found that consumers avoid adverts once they feel invaded and are more receptive to attention-seeking adverts. Interestingly, mobile search advertising recorded an inverse association with user attention (H_9). A negative beta coefficient of −0.220 (P = .00) was found. This means the more mobile search advertising is used, the less it stimulates user attention.

4.5.2. The effect of mobile advertising on consumer interest

All associations between mobile advertising and consumer interest were supported. The *p*-values were lower than.05. This means that app-based, in-game-based, social media-based, SMS-based and mobile search advertising significantly impact consumer interest. These results found supporting evidence in empirical studies (Ghosh et al., 2022; Makudza et al., 2020; Mishra & Malhotra, 2021; Niu et al., 2021). However, SMS (β = −0.308) and mobile search advertising (β = −0.442) recorded negative associations with user interest. The variance may be linked to differences in the target population and facilitating conditions of mobile commerce. This indicates that an increase in SMS and mobile search advertising reduces the stimulation of consumer interest. App-based, in-game, and social media advertising

Table 4. Discriminant validity.

	SMA	MSA	AMA	IMA	SMS	SI	CA	CI	MS
SMA	**0.840**								
MSA	0.698	**0.890**							
AMA	0.747	0.551	**0.777**						
IMA	0.503	0.445	0.668	**0.798**					
SMS	0.476	0.541	0.574	0.501	**0.768**				
SI	0.734	0.611	0.678	0.446	0.454	**0.909**			
CA	0.545	0.349	0.477	0.420	0.628	0.467	**0.805**		
CI	0.475	0.494	0.554	0.545	0.486	0.647	0.749	**0.852**	
MS	0.672	0.509	0.649	0.374	0.567	0.774	0.492	0.569	**0.878**

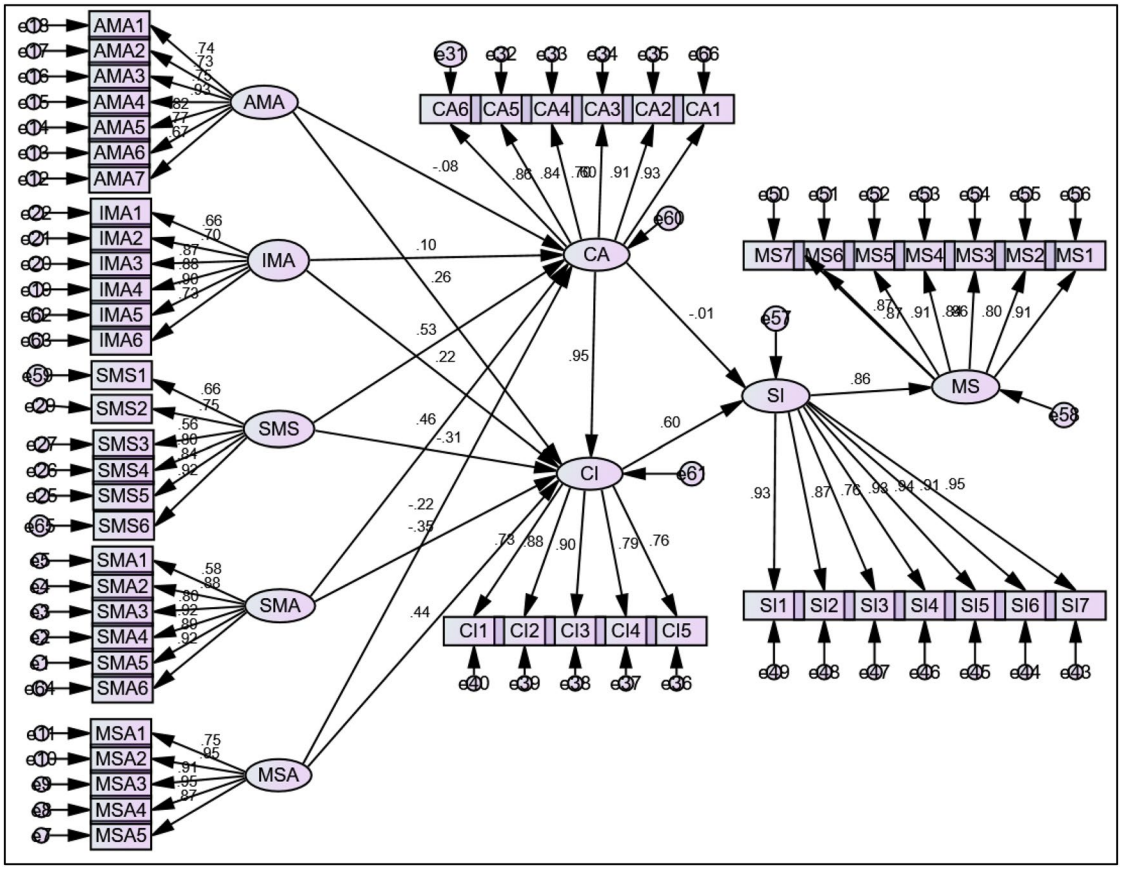


Figure 2. Path diagram.

Table 5. Hypotheses results.

Path/proposed hypothesis relationship	Hypothesis	Estimate	Standard Error	Critical Ratio (T)	*P*-value	Decision rejected/ supported
AMA ---> CA	$H_1(+)$	−.082	.068	−1.538	.124	Rejected
AMA ---> CI	$H_2(+)$	.256	.055	4.416	***	Accepted
IMA ---> CA	$H_3(+)$	.097	.047	1.828	.068	Rejected
IMA ---> CI	$H_4(+)$	.222	.036	4.058	***	Accepted
SMS ---> CA	$H_5(+)$	.527	.061	8.638	***	Accepted
SMS ---> CI	$H_6(+)$	−.308	.054	−4.175	***	Accepted
SMA ---> CA	$H_7(+)$	.455	.059	7.975	***	Accepted
SMA ---> CI	$H_8(+)$	.351	.053	5.077	***	Accepted
MSA ---> CA	$H_9(+)$	−.220	.050	−4.152	***	Accepted
MSA ---> CI	$H_{10}(+)$	−.442	.044	−7.055	***	Accepted
CA ---> CI	$H_{11}(+)$	.947	.078	8.884	***	Accepted
CA ---> SI	$H_{12}(+)$	−.006	.068	−.083	.934	Rejected
CI ---> SI	$H_{13}(+)$	.598	.106	7.397	***	Accepted
SI ---> MS	$H_{14}(+)$	.862	.060	15.961	***	Accepted

positively impacted consumer attention. This indicates that mobile advertising has a significant effect on consumer interest.

4.5.3. Consumer attention, consumer interest, mobile purchase intention and mobile purchase

The traditional AIDA model was confirmed in this study. The journey of consumers begins with awareness, developing interest, then developing an intention to purchase and finally making a purchase. The findings suggest that attention positively impacts consumer interest (β = 0.947; $P = 0.00$; $T = 8.884$) (H_{11}). Furthermore, consumer interest positively impacts mobile purchase intention (β = 0.598; $P = 0.00$) (H_{13}). This thus confirms the mediating effect of consumer interest on the relationship between consumer attention and mobile purchase intention. On the other hand, consumer attention does not relate to the consumer's intention to shop using mobile phones (β = −.006; $T = 0.068$; $P = .934$) (H_{12}). A direct association between intention to purchase using mobiles and actual mobile shopping purchases was also confirmed and accepted (H_{14}), with a strong positive beta of 0.862 and a significant *p*-value of 0.00. Teixeira et al. (2012) found that consumer attention is necessary for effective advertising. Martins et al. (2019) showed that higher purchase intention increases the likelihood of purchasing.

5. Conclusions, implications and limitations

5.1. Conclusion

The article concluded that measures used in the study and the AIDA model were relevant for modelling mobile shopping post-COVID-19. The study concluded that in-game and app-based mobile advertising do not significantly impact consumer attention. In contrast, SMS, mobile search, and social media advertising positively influence consumer attention. Furthermore, the study found that SMS and mobile search advertising negatively affect consumer interest. In contrast, in-game, app-based, and social media advertising have a strong, positive association with consumer interest. Consumer attention positively influences consumer interest, further influencing mobile shopping intention behaviour. The relationship between consumer attention and mobile purchasing intention is not supported. The study indicates that mobile phone-based purchase intentions significantly influence mobile shopping, with Fourth Industrial Revolution (4IR) technologies introducing new, enjoyable gadgets for consumers in this context.

5.2. Implications of the study

The study contributes to cross-cultural diversity in consumer perceptions towards the acceptance and use of mobile commerce, particularly from an African perspective. This diversity provides a platform for fusing behavioural traits that influence various consumers' decision-making processes. Moreover, since Zimbabwe is a developing country which is technologically lagging, the current study provides insight into the level of mobile technological advancement in this country. This is supported by the study's findings, in which two of the study's constructs were not supported based on the insignificance of the investigated mobile applications.

The current study contributes to mobile shopping methodology in that new construct measures were developed, tested and validated. These measures tested app-based mobile advertising, in-game mobile advertising, SMS mobile advertising, social media mobile advertising, mobile search advertising, mobile attention, mobile interest, mobile purchase intention and mobile purchase. Other scholars can adopt these measures, and new constructs can be developed. The study employed a quantitative approach to attain a comprehensive insight into the implications of modelling mobile shopping during and post-COVID-19 as a new and under-researched area. This provided a comprehensive statistical analysis of the measured constructs.

The study emphasizes the need for academia to undertake efforts to develop theoretical frameworks that focus on the evolving trends in mobile shopping, particularly in the post-COVID-19 era. This is substantiated by the increased use of mobile phones by internet users in using their phones to make mobile purchases. Furthermore, it indicates the growing importance of the mobile phone during COVID-19. Studying the implications for modelling mobile shopping during and post-COVID-19 pandemic provides

a guide to privacy issues in mobile commerce. The study, therefore, proposes that the responsible authorities should craft laws that safeguard the protection of consumer rights by mobile marketers. They should be guided by the relevant government authorities in their countries. For example, mobile marketers in Zimbabwe can seek guidance from the Postal and Telecommunications Authority of Zimbabwe (POTRAZ).

5.3. Limitations and future research

Despite making significant contributions to the academic, methodological and policy spheres, the current study has its limitations, which should be addressed by future research. The study only focused on participants in urban areas. Thus, consumers in rural and peri-urban areas were excluded from the research. Future researchers are thus encouraged to consider this segment in their research. The study adopted English as the primary language in administering the questionnaire. However, some respondents failed to comprehend the questions during data collection. The enumerators had to resort to vernacular interpretations. The study, therefore, implores future researchers to consider the impact of the language component in their research. Since the current quantitative study lacks an in-depth understanding of consumer decision-making processes, future researchers should adopt a qualitative or mixed methods approach to augment the current findings.

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Author contribution statement

The development of this article was a direct contribution of five authors namely Forbes Makudza, Rosemary Farayi Masaire, Tendai Makwara, Lucky Sibanda and Tafadzwa Hatidani Tafataona Machaka. All authors shared equally in conception and design, data collection, analysis and interpretation of data, drafting of the article, critical revision for intellectual content and final approval of the final version.

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