

A Cross Sectional Study of Mobile First Digital Engagement, Advertising Impact, and Consumer Decision Making

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Abstract – This paper will consider the existing digital trends in the market, how social factors impact consumers, and the preference of consumers in mobile-first markets. We gathered quantitative data as a part of the research and included the measures of internet use and communication through social media, influence of advertisement, desire to buy the product, and use of mobile apps. This data was collected through a structured cross-sectional survey of 300 internet users aged over 18 years, chosen based on age, gender, and the main device. Descriptive and correlational data show that almost all participants have daily access to the internet, that smartphones are more the priority and that there is an overwhelming inclination to trust interpersonal channels over celebrity approval in making purchases. Advertising on social media has the strongest influence on behavior, whereas design of functional websites and free applications have a significant effect on retention and download intention. The results highlights the shifts in consumer trust relations and point out strategic insights on digital marketing optimization in mobile-based ecosystems.

Keywords – Digital Engagement, Mobile-First Behavior, Social Influence, Online Advertising, Consumer Decision-Making, User Experience, App Adoption.

I. INTRODUCTION

Over a decade, analysts have analyzed digital transformation due to its advantages to both the organization and its client base; it uses technology to decentralize areas of the value chain as well as to re-establish some degree of agency among the consumer base. The shift has triggered change in the corporate structure, consumer behavior and communication channel through which companies communicate with their consumers. The Internet of Things (IoT), blockchain, artificial intelligence, cognitive intelligence, market globalization, telecommunications, wearable technology, e-commerce, the digital era, process innovation, and business models evolved out of the abstract ideas to realities that businesses are forced to embrace and use as a competitive edge.

Smartphones have become an important aspect of contemporary life which offers much better communication capabilities than the voice-calling capabilities of the past generations of telephones and mobile phones. They are offering video conferencing and ubiquitous Internet services to stream music, watch video, e-commerce and access data and offer a more portable and adaptable platform than desktop and laptop computing systems. As of December 2022, approximately one billion

mobile Internet users are in China, and the figure has grown by 36 million the fateful month before, with more than 99 out of 100 people having access to the Internet via smartphones [1]. The wide range and portability of the Internet services provided by smartphones have made them indispensable to any human being who is determined to stay abreast of the fast-paced developments that define human civilization and the web. Improvements and changes in mobile phones have become the means of personal self-expression and beauty.

This intensive use of smartphones requires marketers and organizations intending to remain competitive and relevant to understand contemporary consumer behavior. People have varied expectations and therefore the organizations must alter their marketing strategies in order to meet these expectations. This is by using digital tools and technologies to enhance consumer interaction, personalized marketing campaigns and establishing long-term relationships with customers. Moreover, it is necessary to understand the behavioral adjustments to predict the future trends and create the proactive action based on the evolution of consumer environment.

Consumer behavior is a study of how people, groups, or organizations buy products. It evaluates the processes used to select, purchase, utilize and discard products, experiences, ideas, and services to effectively meet needs and what effects the processes have on the consumers and the society. The field examines the moment and reason behind the purchase of products or services by the customers. It refers to the process of procurement through which any potential buyer, be it individuals, families, or organizations pass through. Consumer behavior is dependent on internal and external factors.

Responses to marketing stimuli are determined by consumer elements such as perceptions, motivation, memory and learning. There are a lot of methods of analyzing consumer behavior; systematized market research allows organizations to know their clients and apply the findings to business decision-making, which makes a significant contribution to the company performance and profitability. Consumer behavior is influenced by economic, sociological as well as psychological aspects. Advertisements and marketing messages have a strong impact on the purchasing behavior of consumers. According to Ots [2], advertising aims at drawing customers. The AIDA model outlines the aspects of Attention, Interest, Desire, and Action, and thus encourages consumers to have a greater awareness of a product or brand. Meanwhile, the demographic forces like ageing, urbanization, and the changing family setups have a significant impact on consumer behavior. Understanding the effect of such transitions on customers preferences, purchasing behaviors and demands of products is highly critical to companies that strive to be responsive in a market environment that is becoming dynamic.

The argument of traditional and electronic media is relevant. The traditional media all over the world are witnessing a significant drop in circulation. Advertisers and people in the field of media management are faced with uncertainty. According to Turner [3], mass media are not hiding; instead, they are being increasingly added and augmented with a myriad of new ways of engaging consumers. The communication environment is changing due to consumer decisions and technological advances. In their research on the consumption of news within the United States, Althaus, Cizmar, and Gimpel [4] admit that there were no final conclusions because their study employed an analytical method that distinguishes between the use of print, broadcast, and Internet media, thus hampering the investigation of the assimilation of news by consumers using different media channels. The interplay of the traditional and social media impacts consumer behavior in the traditional media, which has been studied in the past.

The high pace of global migration towards mobile based digital communication has redefined the ways consumers seek information, judge brands, and make decisions in buying products and services. However, there is limited integrated evidence on the association between social trust, exposure to advertising and user experience and behavioral outcomes. The study will examine the following relationships in a quantitative manner in order to inform the data-driven digital marketing approaches and user-centric platform design.

The paper has been structured in the following way: Section II contains the theoretical background of the paper that will discuss the most prominent concepts of mobile-first development, the role of advertising in shaping consumer behavior, and the effect that customer experience may have in the online environment. Section III is the methodological framework of the study, in which the research design, the characteristics of the sample, measures of data collection and analysis methods are presented. Section IV describes the empirical results with a focus given on the trends of digital consumption and the motivational power of advertising, as well as the factors that affect adoption of mobile applications. Lastly, the Section V provides a final conclusion, which summarizes the key findings, outlines the implications of the future development of digital strategies, and suggests the areas of future research.

II. THEORETICAL BACKGROUND

Mobile-First Development

Mobile-first development has become a critical strategy in the modern digital ecosystem and it serves as the key driver of paradigm shifts in the development, design and delivery of web and application interfaces. Richardson, Campbell-Yeo and Smit [5] are also very critical of the impact of this strategy on user experience and developer efficiency; and are categorical regarding the role of mobile devices as mediating variables between digital interaction and its increased importance. The increased popularity of tablets and smartphones causes the developers and designers to focus on the mobile usability, thereby changing the existing design and development approach.

Roth et al. [6] goes on to make a synthesis of available literature and case studies to outline key variables that contribute to improving user experience by mobile-first designed websites. Mobile-first development preempts critical information and simplified functions, and again, users are not subjected to cognitive overload since they are able to use the primary aspects of

the application, which makes them easier to navigate. Bhuttoo, Soman, and Sungkur [7] also explores how responsive design, adaptive interfaces, and performance optimization can be realized when the mobile constraints are considered to be front-and-center in the development process.

In addition, Roth, Griffin, and Huang [8] considers whether mobile-first techniques affect the development efficiency. The traditional development process has the tendency to favor desktop-based design before later adapting it to a mobile platform based, a chronological process that can potentially introduce inefficiencies in the development process since the process requires a lot of redesigns and reengineering to fit into the limitations of mobile development. Conversely, mobile-first approach enables the creation of lean code, initial testing on mobile platforms, and a single design approach that reduces duplications. Empirical results based on a series of case studies prove that companies embracing mobile-first approaches have faster time-to-market and better code maintainability and lower development costs.

Advertising's Influence on Consumer Behavior

Alsharif et al. [9] conducted a thorough survey of the important concepts touching on the advertising and consumer buying behavior. The research also critically examines the previous studies and obtained conclusions about the effects of advertising on purchasing behavior, and indicates gaps in the current literature and methodological limitations of the current literature.

It is important to have a complete knowledge of the impact of advertising on the purchase-making process and this requires a theoretical framework on which it is based. There are quite several theoretical constructs and models that have been put forward to define the connection between consumer behaviors and advertising. The ELM (elaboration likelihood model) [10] argues that persuasive power of advertisement will depend on the cognitive processing and involvement of an individual to the advertisement.

AIDA is a model that suggests advertising as the creation of awareness, attention, interest, desire, and action result in consumer behavior. Advertisement can influence consumer analysis of the quality of the brand, trustworthiness, and loyalty. Moreover, advertisement can influence the buying behavior by creating a feeling of urgency or scarcity and this can lead to impulsive buying decision.

Customer Experience and Loyalty

Customer experience is an immediate impact of digital innovation and has become a vital part of the loyalty programs. Digital platform usability and design increase customer satisfaction, which supports trust and generates loyalty. Moreover, personalization of engagement in the context of an omnichannel is inevitable, and it enhances perceived value, improves engagement, and builds long-term loyalty. Discounts and free products are other forms of incentives schemes which are effective loyalty schemes that promote repeat buying and maintain the growth in sales [11].

Social media is a growing area of digital innovation, which allows organizations to understand the perspective of clients and needs better. Allowing real-time interactions and instant feedback, social media makes experiences more personal and improves the effectiveness of the strategies to encourage loyalty, thus complementing the initiatives in the area of usage, design, and incentive designs to encourage customer interaction [12].

Consumer retention is not only a quantitative index; it is a critical indicator of a sustainable growth and profitability. Loyal customers have more chances to purchase again, recommend the company, and achieve better customer lifetime value (CLV). Empirical research shows that the cost of acquiring a new client is five to seven times more than that of keeping an existing client, and thus retention is a feasible growth strategy. The reason why achieving high retention rates in online markets is difficult is because the customer expectations are heterogeneous, switching costs are minimal and there are numerous alternative products that customers can use [13].

III. METHODOLOGY

The research design used in this study is a structured quantitative study aiming at examining the trends of digital engagement, social influence on consumption habits, and consumer preference towards web and app-based interactions with the site. The research approach was developed with the purpose of having a strong data collection, a solid analysis, and reflective findings on current mobile-first digital settings.

Table 1. Demographic Variables of the Respondents

Characteristic	Category	Frequency	%
Age Group	18–25	120	40
	26–30	100	33.3
	31+	80	26.7
Gender	Male	150	50
	Female	150	50
Primary Device Used	Smartphone	200	66.7
	Computer	70	23.3
	Tablet	30	10

Fig. 1 shows a sampling map of the spatial distribution of the respondents and as such, it covers both urban and semi-urban areas and thus covers survey representativeness.

Research Design and Sample

The survey design adopted was cross-sectional to capture the behavioral patterns as well as preferences of digitally active people. This method is used to offer an outlook of the existing trends in internet usage, involvement of social media and how responsive online advertising is among various demographics. Internet users aged 18 years and older were targeted as the population, and divided into three age groups: 18-25, 26-30, and 31+ years. Proportional representation was also done based on gender and the primary device used.

A stratified random sample method reduced the level of selection bias and ensured that subgroups were well represented. The last sample was a sample of 300 respondents in urban and semi-urban areas that had a high internet penetration. The sample is summarized in terms of demographics as presented in **Table 1**.

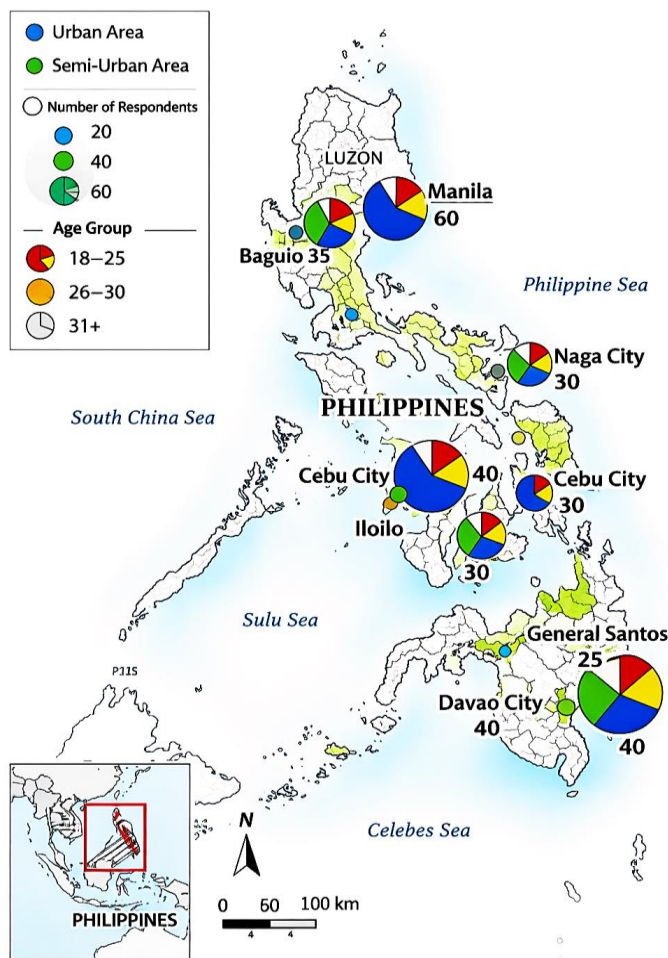


Fig 1. Distribution of Survey Respondents Geographically.

Data Collection and Instrumentation

The research was conducted based on a structured questionnaire, which was clearly designed to be used in the current research. It was set in the form of four sections (i) pattern of digital use, (ii) social media use and online behavior, (iii) factors that affect online purchasing behavior, and (iv) preference of user experience and triggers of adoption of mobile-app. Quantitative and ordinal data were represented by a combination of multiple-choice questions, Likert-scale questions and ranking questions.

Questionnaire was pretested on pilot sample of 30 respondents to determine their clarity, relevancy and reliability. Changes were made based on the feedback with regards to unclear wording and redundancy. The completed survey was conducted electronically, thus, eased the process of capturing data automatically and allowing access to respondents who are frequent internet users.

Data Analysis Procedures

The data were then exported to statistical software which was used to clean and analyze the data. The demographic features, patterns of digital engagement, and the preferences of the users were summarized with the help of descriptive statistics such as frequencies, percentages, and cross-tabulations. Comparison of subgroup analyses identified age groups, gender, and major device modalities differences. Further, cross-sectional correlation tests were used to evaluate the relationships between online

behavior and responsiveness to different forms of advertisements, preferences of users experience and the probability of adoption of the apps. A visualization of the analytical framework is provided in Fig. 3 with the relationships between constructs, variables being measured, and expected results in Table 2.

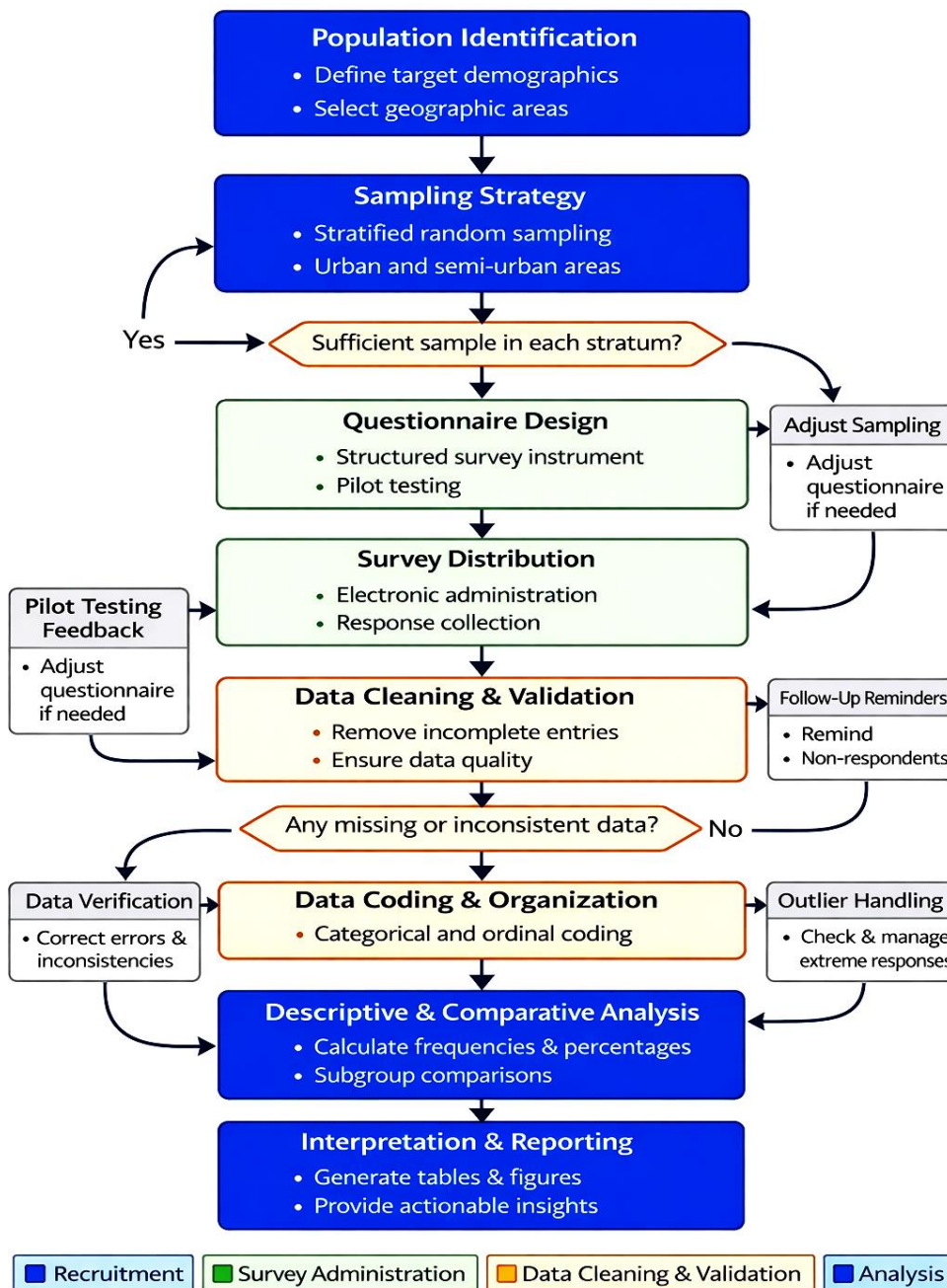


Fig. 2. Survey Process Conceptual Data Flow Diagram.

Fig. 2 presents the conceptual data flow diagram that shows how data will flow starting with the recruitment of survey participants to data collection then to data cleaning and analysis.

Table 2. Key Constructs and Measurement Indicators

Construct	Measurement Indicators	Type of Question
Internet Usage Frequency	Hours per day on the Internet, patterns of logging-in	Multiple-choice
Social Media Engagement	The type of platform utilized, duration, number of profiles	Multiple-choice
Advertising Influence	Credibility in recommendations, type of ad preferred	Likert-scale
App Adoption Triggers	Justification of using apps, type of apps.	Ranking/Multiple-choice

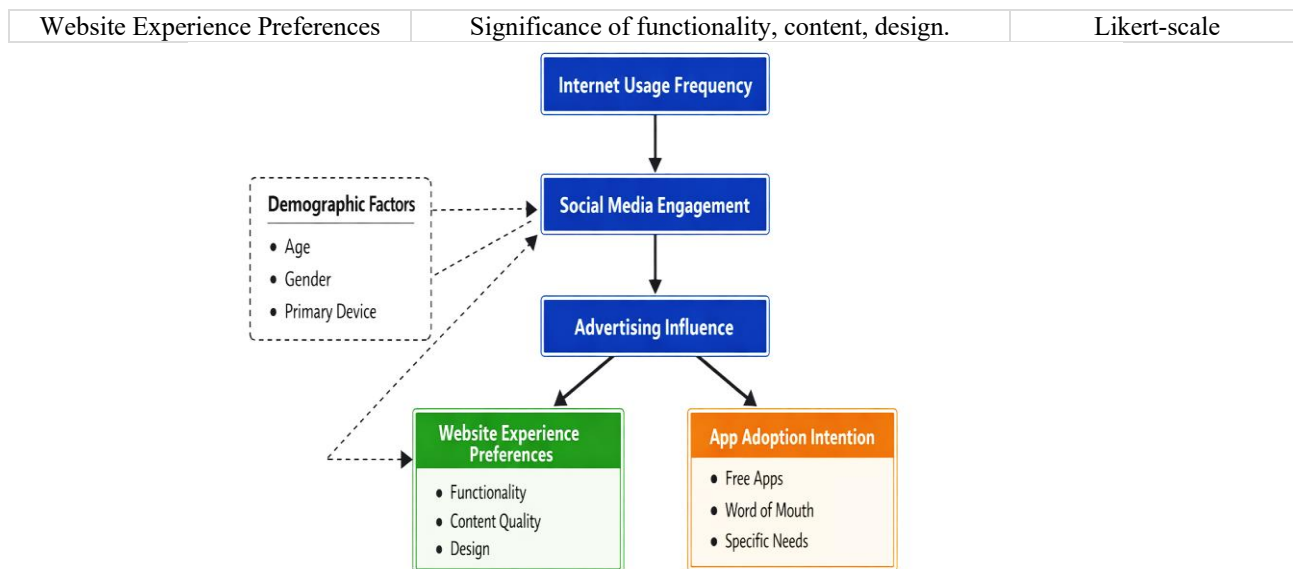


Fig 3. Analytical Framework Which Connects Constructs and Measured Variables.

IV. RESULTS AND DISCUSSION

Patterns of Digital Use and Social Media Interactive

A whopping 97% of the respondents indicated that they use the digital world on a daily basis with 67% of them using the Internet during the day and 30% of them using the Internet more than once a day. Approximately 3% had several interactions a week. Every respondent was interacting with the Internet at least a few times in a week.

The results suggest that there was a change in culture where people have developed a trend of using smartphones as the main means to access the Internet with 67% indicating that they mainly used smartphones to access the Internet. The remaining 33% were using several devices; 23% used the Web through a computer and approximately 3% used a tablet. In regards to preferred digital activities, mobile instantaneous messaging proved to be the most popular choice between the gender, and the opportunity to find information and read news proved to be the second most popular one.

The answers revealed a reluctance of males to online payments where none of them chose purchase related activities. Purchase intention and choice are major areas of study in consumer behavior studies whereas the reasons that lead to customer reluctance before making a purchase have not been properly investigated. To explore consumer online purchasing reluctance determinants in e-commerce retail, Phamthi, Nagy, and Ngo [14] use the perceived risk theory to examine the effects of different dimensions of the perceived risk which are affected by consumer trust on purchase reluctance at the checkout point. It is also through them that they analyze the moderating impact that online shopping experience has on this influencing process among consumers and come up with a test model that includes modulating variables.

Han and Kim [15] experimentally study the variables that cause buying hesitation based on the literature review and logistic regression using actual transaction data of Taobao. They have found that the seller risk (as indicated by seller credit rating) has a strong negative effect on buying hesitation, and that the order quantity (i.e., financial risk and price dispersion, indicative of the product risk) has a positive effect on purchase reluctance. Customer experience is an intervening variable in the above process. The various roles of the gadget used by the buyer, the platform used by the seller and the gender of the buyer are also looked into in this article though it leaves out some confounding factors contributing to involuntary reluctance.

Most of the respondents in the age group 18 to 25 years favored online video watching but there was a decrease in the percentage as the age increased. About 73% of the respondents indicated that they had accounts on the different social media, whereas only 5% showed that they have no other social networking accounts. Facebook leads the popularity with 33%, Instagram with 22, LinkedIn with 18, YouTube with 17 and Twitter with 8. Facebook ranks as the most used and common among users in most platforms and the most heavily used with 62% of the respondents showing strong use, and previous studies also show the same.

On their social media login behavior, 84% of the participants answered that they log-in to their accounts daily, 47% said that they are actually always linked and the rest 37% commented that they visit the social media different times in a day.

Consumer Trust, Advertisement Influence and Purchase Drivers

When the respondents were questioned as to the main reasons that drive them to try new products or services, 27% claimed that they trust their friends and relatives, which makes them the most powerful source. A quarter of them (22%) said that they consider online advertisements an important factor in their buying decisions, and a fifth (20%) said that they use their own tastes.

Unexpectedly, the answer that they were affected by the presence of celebrities using the product or service was not selected by any of the participants, which does not align with previous studies that showed that celebrity endorsement promotes sales of

products [16]. The promotion of celebrity endorsements in advertising is widespread as it creates the trust of both current and potential buyers, ensures a higher level of brand recognition, and involves the attendance of new categories. The endorsements can also produce a positive effect on the tendency of consumers towards a product, a phenomenon which is often fulfilled by suggesting that the success, skill, or attractiveness of the celeb can be explained, at least in part, by the product.

Kim, Choe, and Petrick [17] establish that when a celebrity is associated with a brand, the perception of the consumers towards the brand is affected. Most celebrities are using their powers to increase the perceived credibility and reliability of the promoted products. Since some celebrities are highly regarded by many people, the endorsement of a product may promote consumer confidence in a brand tremendously.

According to Dwivedi, Johnson, and McDonald [18], this may be harmful to the business in cases where the celebrity receives negative publicity. When an endorser loses credibility due to accusations of illegal, unethical, or non-traditional behavior, it will reduce attitudes towards the celebrity and the brand being promoted. The influence of celebrity endorsers on the business is drawing fans and stimulating consumer interest in the business thus increasing brand awareness and intentions to buy. Celebrity likability and compatibility between the endorser and the endorsed brand determine the level of receptiveness to advertisements, which in turn affects brand purchase intentions attitudes.

The perceived legitimacy and profitability in using a celebrity as an advocate helps the consumer trust in his or her purchases. The effectiveness of a celebrity endorsement is based on three constructs of the source, which include knowledge, attractiveness, and trustworthiness. As a result, marketers need to pick superstars that are considered most attractive, entertaining, popular and talented to the target audience.

The study of gender-based tendencies revealed that 35% of men tend to test a product or service more, when, with expert advice, and only 7% of women tend to do the same. In the age demographics, 18-25 years seem not to be impacted by credible blogs; however, this age group is two times more likely to be persuaded by the recommendations made by family and friends than individuals in the 26-30 and 31+ age bracket.

The respondents were required to answer the question as per whether they concurred with the statement that the more they are exposed to the advertisement, the higher is the chances of buying the goods. Almost half of those who participated in the survey supported the statement on the effectiveness of the repetition of adverts and 28% were not sure and chose the option of not sure. The data show that the percentage of those respondents who agreed with the statement was greater among the female respondents than it is among the male respondents. The level of disagreement about the statement increased substantially with age and change to older ages (0-41) (refer to **Fig. 4**).

In a further evaluation of internet advertising efficacy, the firm sought the services of its consumers to rate different types of online advertising based on their effects on the purchase behavior. Social media ads were also considered to be the most efficient type of digital advertising, 28% of the respondents thought that the ads are the most efficient type of digital advertising. Banner ads were second with 20% and articles followed with 17% and Google advertisements in the 15% category and email advertising and flash ads were the least effective at only 13 and 7% respectively. The statistics indicate that there is a great gap between men and women. Although social media advertisements were viewed as the most efficient form of online advertisement by both sexes, the females viewed as the next most effective were the articles followed by email advertisements as the third most effective, whereas males viewed banner advertisement as the second and Google advertisements as the third.

Although the participants reported that internet advertisement has a rather great impact on their purchase behavior, it was considered important to explore whether a more immediate questions approach could lead to dissimilar results. The studies have shown that different question wording can cause bias on the answers and can show a vastly different result. As a result, the respondents were questioned as to whether they pay attention to internet advertisements, to which 54% answered that they occasionally listen to digital commercials. The other 46% was further subdivided into persons who pay attention (28%) and those who do not (18%). Age analysis revealed that people aged 18-25 years were highly likely to completely ignore web advertisements than older groups.

Mobile App Adoption Behavior and User Experience Preferences

The survey respondents were then analyzed on their preferences as to whether they would receive regular updates and promotional literature by the firms or not. The category of response that came out as the most preferred is the one that said “follow on social media, then, subscribe to obtain email messages, and receive through textual messages”. The participants were then shown 7 potential attributes of a site and asked to rank the importance of the attributes in a relative manner.

According to **Fig. 4**, functionality is the most salient characteristic, and 31% of the respondents chose it. A site is supposed to play the role it is meant to perform; otherwise, users will be inclined to drop the site, which will relate to the bad experience thus creating a negative association. The second and third important attributes were quality content (18%) and simplicity (17%). These results reinforce the significance of the quality of content and user-friendliness in the process of getting the best user experience.

Irrespective of the popularity of mobile phones, some statistics show that a lot of applications are not downloaded; in addition, past studies show that the average mobile phone user has approximately 30 applications on the phone, but only utilizes 3 or 4 of them on a regular basis. The current paper supports this point of view, where approximately 13.01% of the sample expressed that they favored upgrades that are sent through a mobile application download. Reactions to the queries that comes just before the last one provided better information about what factors the respondents may have been driven to download an application. The social networking applications were the most preferred with 28% of the participants highlighting this category

but 14% and 17% indicated shopping and music application, respectively (see **Fig. 5**). To answer the above queries, the final concern aimed at determining the factors that would force the participants to download the application.

This decision to download an application has two salient differences with the traditional IT adoption decisions [19]. To begin with, it is possible to make the decision at an accelerated rate significantly faster than it would be possible under the current conditions, say, in several seconds. Second, due to the speed of the decision-making process and the low stakes involved, the decisions that involve downloading the apps are regulated by the System 1 cognition, which is defined by the intuitional, quick judgements instead of the analytical, deliberate judgements.

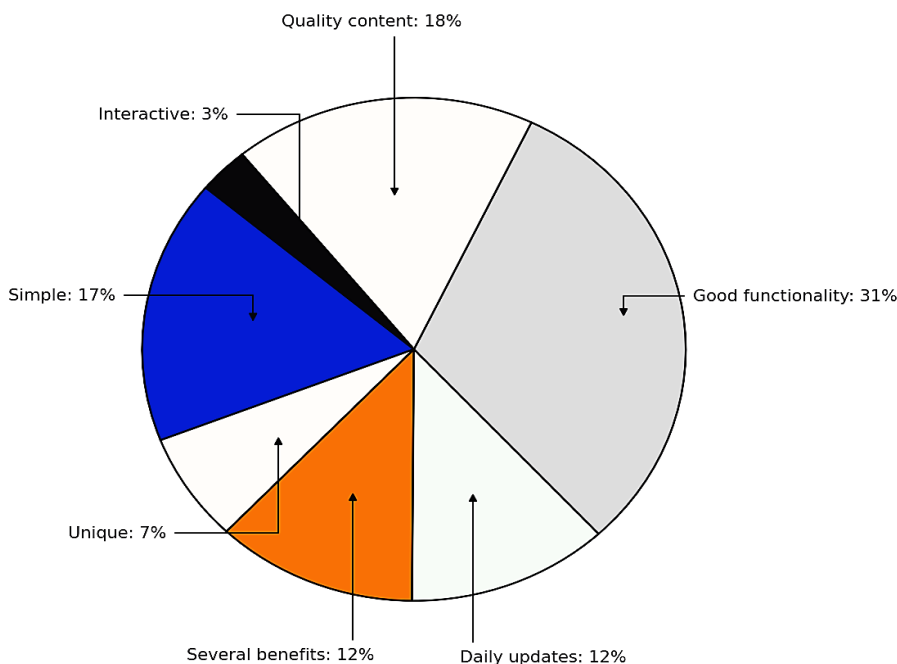


Fig 4. Sample Distribution on the Elements that Drive Customers to Be Retained in the Site (Percentage).

These two differences are not only an obstacle on the way to creating a model of app-download decision-making, but also an opportunity. The challenge lies in the fact that the speed of the decision-making process is accompanied by the lack of clarity of the reasoning behind a decision, as it may not be easily visible, even to the very decision maker [20]. In turn, traditional methods of investigations are objectionable. It is enabled by the opportunity as neuroscientific technologies allow studying the brain activity in a brief time.

According to **Fig. 6**, 44% of interviewees have cited the availability of an application free of charge as the major driving force behind the installation. One of the secondary factors explained 17 % of the motivations and was a specific need or interest that was not handled by a mobile site; and then word-of-mouth and recommendation collectively described 16 % of the motivations. When asked about their aversion to paying to use an application, the respondents tended to say they will not download it; therefore, when an application is shown to a customer, the probability to download the application will be greater in case the applicant claims to have continued to use it or assuming that his/her peers have done the same.

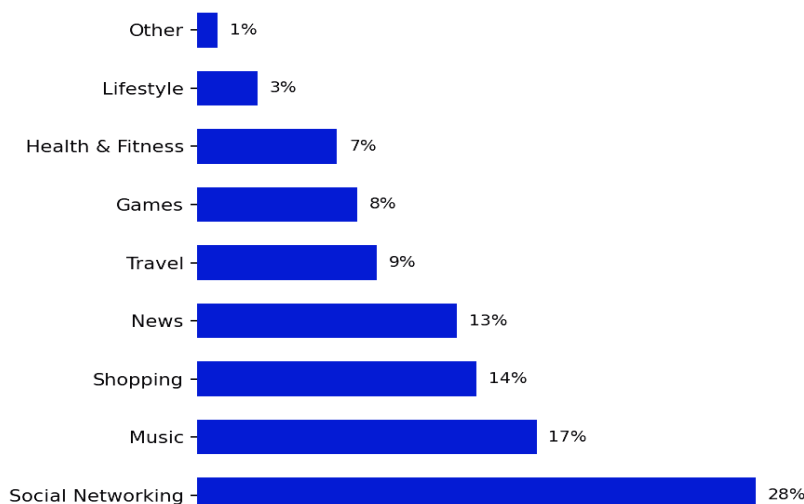


Fig 5. Sample Division According to the Most Preferred Types of Mobile Applications (Percentage).



Fig 6. Sample Distribution on Variables Affecting the Downloads of Applications (in Percentages).

V. CONCLUSION

According to our findings, mobile platform, socially mediated interactions and experience have the most powerful impact on the behavior of digital users. The dynamics of everyday internet usage, as well as the prevalence of smartphone usage, supports the convergence of mobile-first consumer spaces. Interpersonal networks facilitating trust are better than trust obtained through celebrity-endorsed, hence suggesting a change of the structure of relational credibility to the level where it becomes the leading force of persuasion. The advertisement paradigm utilized by social media has been found to be the most efficient means of promotional communication; however, empirical evidence has shown that the intents of users is choosy, therefore, a delicate balance between pertinence and repetition is required. The general usability of the site, existence of the content and simplicity of the interface significantly influence the level of user engagement in a long-time perspective. On the other hand, free accessibility and perceived usefulness decisively affect the use of mobile applications. In general, our findings prove that the principles of trust-based communication, maximization of mobile-specific usability and value-based interaction should be the principles that the effective digital strategies should be supported by.

CRedit Author Statement

The authors confirm contribution to the paper as follows:

Conceptualization: Deng Kai and Michael Davis; **Methodology:** Deng Kai and Michael Davis; **Data Curation:** Michael Davis; **Writing- Original Draft Preparation:** Deng Kai and Michael Davis; **Investigation:** Deng Kai; **Supervision:** Deng Kai and Michael Davis; **Validation:** Deng Kai and Michael Davis; **Writing- Reviewing and Editing:** Deng Kai and Michael Davis. All authors reviewed the results and approved the final version of the manuscript.

Data Availability

No data was used to support this study.

Conflicts of Interests

The author(s) declare(s) that they have no conflicts of interest.

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Competing Interests

There are no competing interests.

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