

EXPLORING THE INFLUENCE OF INTERACTIVE WIRELESS ELECTRONIC BILLBOARD ON SMARTPHONE PURCHASING CHOICES AMONGST UNDERGRADUATES IN SOUTH-SOUTH UNIVERSITIES, NIGERIA

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ABSTRACT

This paper titled: Exploring the Influence of Interactive Wireless Electronic Billboard on Smartphone Purchasing Choices Amongst Undergraduates in South-South Universities, Nigeria describes an electronic billboard system also called Interactive Wireless Electronic Billboard or Smartboard that processes and displays short-range wireless advertising capability for sales of Smartphones. The researcher using survey research design attempts to find out if the use of interactive board is effective in influencing purchase decision for Smartphones amongst undergraduates of universities. Following the analysis of data generated from questionnaire, the paper finds out that Interactive electronic billboard is effective in influencing the Smartphone purchasing choices amongst undergraduates. It revealed that a higher percentage of undergraduate Smartphone users purchased their Smartphones after exposure to interactive wireless electronic billboard advertising. In line with these findings, the paper recommends among other strategies, integrating interactive components to augment electronic billboard advertisements, to enable advertisers leverage on the benefit of these billboard advertising and to penetrate other market segments.

Keywords: Advertisement, Electronic Billboard, Interactive wireless Billboards, Smartphone, Undergraduates

1.0 INTRODUCTION

Billboards have become a viral outdoor advertising medium and a significant medium for promoting a wide range of products. This is remarkably accurate for smartphones, which differ from regular mobile phones' operating systems. Smartphones have garnered a significant user base and are now considered essential in personal and professional spheres of life (Martins et al., 2018). Smartphone manufacturers and advertisers strategically utilize billboards to promote

their goods due to their superior recall rate unlike broadcast and print media, this is because potential customers frequently see billboards daily.

The rise in billboard advertising highlights the influence of billboards on product promotion. Billboards are often positioned in areas with significant human footfall. As a result, those who utilize these locations are frequently subjected to the advertisements shown on the boards. Furthermore, billboards provide a significant level of geographical adaptability. The boards may be positioned precisely according to the marketers' original intentions.

Moreover, they often exhibit a cheaper cost per thousand (CPM) than most other advertising channels. Typically, they provide better cost-effectiveness, particularly for advertisers operating on a limited budget. Billboards provide the benefits of excellent colour reproduction and serve as an effective medium for reminding and influencing impulsive shoppers (Yee et al, 2014). Electronic Billboard advertising market has increased over the years because, most visual design concepts used in outdoor advertisements effectively are capable of persuading viewers' decisions to buy, particularly concerning Smartphone sales. Most electronic boards display all aspects of the advertised phones, dissecting and displaying every part and its functions from different angles thus attracting buyers more than advertisements on static billboards. These adverts may arouse interest of prospective customers thus increasing their purchasing decisions and usage of Smartphone, more so that it has upgraded interactively.

The Electronic billboard system called Interactive Wireless Electronic Billboard is a modern type of billboard. It is a data processing system furnished with a display device and short-range wireless communication ability, such as Bluetooth. Prospective users of the Interactive Wireless Electronic Billboard are commercial producers, advertisers and business dealers. In this application, the display device displays product advertisements while data processing system uses wireless communication interface to communicate with nearby mobile devices such as Personal Data Assistants (PDAs). When an advertisement is seen on a display device, a customer may commence a request from his mobile device to start an interactive procedure with the electronic billboard system to get more information, or to complete the transaction of buying the advertised product with mobile devices like PalmPilot and mobile phones. While this electronic billboard displays product advertisements, it interrelates with nearby clients' mobile devices through the wireless communication interface.

Before now, there was and still is, the non-electronic billboard or traditional billboard, as a form of Out-door advertising medium It is one of the many ways outs of graphic communication through which products, services and messages are sent to a wider audience. These billboards came into being because of the advancement of signs, which were initially correlated to gesture or motion. It however became notable in the 1930s when merchants were asked to label their premises with their own signs.

The importance of billboards became much in England in the 16th century. According to Ogunlade, (2011), merchants were directed to mount their signs on their building surfaces. This encouraged the idea of house numbering for easy identification. These eventually led to the installation of static larger boards on housetops to create awareness and draw prospective consumers' attention to goods and services. These Billboards were used to deliver advertising and informational messages to people who are passing by the displays. They metamorphosed

into the contemporary electronic billboard system called Interactive Wireless Electronic Billboard, a modern type of billboard that is a data processing system furnished with a display device and short-range wireless communication ability, such as Bluetooth. When an advertisement is seen on this electronic display device, a customer may commence a request from his mobile phone to start an interactive process with the electronic billboard system in order to get more information, or to complete the transaction of buying the advertised product, with mobile devices like PalmPilot and mobile phones. While this interactive electronic billboard displays product advertisements, it interrelates with nearby clients' mobile devices through the wireless communication interface.

Electronic billboard advertisement appeals more to the eyes because of its brightness, spectacular designs and use of bright colour. It also displays multiple messages with attractive visuals and can be updated remotely allowing for timely and targeted contents.

There are evidences to suggest that electronic billboard for outdoor advertising is considered to be effective in marketing because of its importance to marketers and prospective consumers. For examples,

1. Apple's iPod Silhouette Campaign created by TBWA/Chiat featured colourful Silhouettes of people dancing while wearing white iPod earphone. This dramatises the simplicity and vibrancy of advertisement conveying the joy of listening to music with an iPod. The success of it can be measured in its being the most popular culture of youths across virtually every part of the world today.
2. McDonald's "Im Lovin'It" campaign. This campaign is adopted world-wide, showing simple and catchy phrases alongside images of McDonald products, It evokes positive emotions and associate them with the brand.
3. NIKE's "Just Do It" slogan paired with powerful visuals and athletes was instrumental to reinforcing the brand's association with sport, determination and achievement. The campaign was developed by Wieden and Kennedy.
4. Ogilvy & Mather also created the "Share a Coke" for Coca Cola which was another instant success. It encourages consumers to find a bottle of Coke with their names or the names of their friends. These campaigns were effective because of their simplicity, powerful messaging and ability to resonate with consumers on an emotional level. These campaigns surfaced on electronic outdoors advertising media and were considered good ways of marketing in most categories because of their different allure and dramatic contents which cut across the social and economic divides.

Contemporarily, Smartphones are at the heart of many individuals because of their convenience for handling, regardless of their sizes having many applications, easy to access the latest cyber sources, and for their multiple functions. Similarly, with a smartphone, one cannot only just call and send messages to others, but can use the internet easily and can connect on social media portals like Facebook, Twitter, WhatsApp, Viber, etc. along with audio-video facilities and instant messaging. These features draw a demarcating line between ordinary mobile phones and Smartphones making their usage easier and more user-friendly and they increase their utility for the consumers (Kaushal, 2015). The demand for smartphones is on the increase

around the world. Despite this fact, Smartphones usage is still at its early stage in Africa, thus the necessity for strategic marketing by the use of the electronic billboard with incredible features that enable advertisements of smartphones, explicitly displaying their features and functions, and greatly influencing undergraduate students' purchasing choices.

Kolawole (2017) claims that Nigeria has one of the fastest-growing Smartphone marketplaces in Africa, with young Nigerians owning the majority of the country's popular Smartphone brands, including Samsung, Tecno, Itel, Infinix, Nokia, Huawei, Lenovo, Fero, Alcatel, Gionee, and Apple. With the current technological progress, Smartphones have become indispensable to keep up with the developments in the modern age. This is due to the growing demand for smartphones and the escalating competitiveness within the smartphone industry (Chen et al., 2016). This trend is expected to continue, as innovations and advancements in Smartphone technology are introduced. Hence, the researcher explores the influence of interactive wireless electronic billboard on Smartphone purchasing choices amongst undergraduates in South-South Universities, Nigeria.

1.1 Objectives of the study

The objectives of this paper are:

- i. To examine the influence of Interactive electronic billboard on smartphones purchase choices of undergraduates of South-South Universities, Nigeria.
- ii. To find out the effectiveness of Interactive electronic billboards on the sales of Smartphones amongst undergraduates of South-South Universities, Nigeria.

2.0 REVIEW OF LITERATURE

The electronic billboard system called Interactive Wireless Electronic Billboard is a modern type of billboard used for processing data in form of advertising messages for display to customers. Because it is an internet-based device, it can demonstrate short-range wireless communication ability by means of Bluetooth capability. This application is used for applying wireless communication to data processing and interfacing with prospective customers who are mostly tech savvy youths and university undergraduate students. In this age of digital technology, the Smartphone marketers would focus more on internet advertising but in reality, outdoor advertising is still a popular means for smartphone brands to reach consumers. Ajayi (2005) noted that advertising agencies in Nigeria are taking the outdoor advantage and constantly seeking new artistic and colourful ways of product appeal.

According to Kayode and Afolami (2013), in their Recce-Myron's study maintained that billboard advertising industry has significantly grown due to the persuasive nature of visual design concepts utilized in outdoor advertisements, which successfully influence viewers to make purchasing decisions. These factors also influence the buying choices of potential smartphone buyers.

Oyeyinka, Oyeniran, Adekola, Ishola, Aransiola (2020) investigated Digital Billboard Advertisement and Smartphone Purchase Decisions of University Students In Ibadan Metropolis. The study evaluated the influence of digital billboard advertisements on smartphone purchase decision of students in Ibadan Metropolis, Oyo State, Nigeria. The

objectives of the study was to ascertain the extent of Smartphone brands' patronage associated with exposure to billboard adverts and to identify the types of digital billboard advertisements that were most effective for Smartphone advertisement to university students. The researchers employed the survey design. Findings showed that the purchase of smartphones by majority of the students was associated with exposure to digital billboard advertisements. The smartphone brand, Infinix, had the most patronage related to digital billboard exposure. The digital billboard with the capability to influence purchase decisions was the electronic/video-like billboards. The study is similar to the present study in that, both studies used the survey method to provide empirical evidences on identifying the types of digital billboard advertisements that are most effective for smartphones advertisement to university students. The present study, however, differs from Oyeyinka et al (2020) in that it focuses on the interactive electronic billboard, a more advanced version of the billboard that, while displaying product advertisements, interrelates with nearby clients' mobile devices through the wireless communication interface, enabling instant purchase at the point of decision making, thus avoiding change of purchase decisions due to lack of immediate access to the products.

Cunningham and Coleman (2015) carried out a study to assess the effectiveness of billboard advertising in influencing the purchase decisions of adolescents. A telephone survey was done in Baton Rouge, Louisiana, with 517 residents. 32.0 percent of the subjects showed independent memory of at least one billboard advertisement, whereas 36.0 percent had assisted recollection. The study further discovered that advertisements for products or services with high awareness exhibited a stronger capacity to be retained in memory, whereas longer campaign durations were linked to enhanced recall. In addition, the study revealed that women had a stronger propensity for positive emotions and heightened focus on billboard advertising in comparison to males. Younger persons showed a greater inclination towards favorable attitudes towards ads, although age did not show any association with attention. Regarding the boards in the investigation, women and those with children had a greater inclination to concentrate on these particular boards. People with higher levels of education and greater income exhibited higher levels of unaided memory retrieval. Conversely, people with lower levels of education had higher levels of aided memory retrieval. The relevance of this study comes in its analysis of the influence of billboard advertisements on certain demographic segments, such as gender and age, as the present study looks at its influence on youths (undergraduates) in the South – South Nigeria. The objective is to analyze the views of these specific groups regarding billboard advertisements.

Kayode and Afolami (2013) conducted a study to examine the influence of billboard advertising on customers' buying behaviour in Lagos State. The study analyzed five factors and their corresponding probabilities displayed to participants in a set of tables. The criterion consisted of several parameters, such as the placement position and the channel type used to display the advertisement. The general agreement is that good billboard product advertising efficiently conveys the relevant message to the intended audience at the ideal time and place. The study proposes that selecting appropriate placements for billboards provides multiple benefits by effectively reaching prospective audiences in different places and at different times when they are in motion. This study differs from the present study, only in the areas of appropriate placement and interactive feature of the billboards.

Haritaoglu and Flickner (2001) describe a real time vision system for electronic billboards that can detect and count number of people standing in front of the billboards, determine how long they have been looking at the advertisements currently shown on the billboards, and try to obtain demographics information about the audience automatically to determine when and which advertisements might be shown on the electronic billboard to reach a targeted audience. Instead of using infrared illumination based pupil detection to detect whether people are looking at the billboard, this paper proposes to use short-range radio communication to determine the usage of a particular advertisement. The study is similar to the present study in the areas of usage of short-range radio communication to determine the usage of a particular advertisement.

Hussain and Nizamani (2011) conducted a study on the factors affecting consumer attention on billboards advertising in Karachi, Pakistan with the aim of understanding the consumer attention towards billboards, whether the target audience gives importance to the billboards or not. Non-probabilistic sampling technique was used to collect data from a sample of 300 respondents and T-test was employed to evaluate the hypotheses in the study. It was found that many factors in the billboards advertising attract the customers. A customer gives proper attention to billboard advertising due to billboards' advertising Size, Colour, Location, Celebrity and Images. All these segments were found to have positive impact on customers' attention. This study was conducted in India, and viewed from a developing country's perspective as so is Nigeria.

Mustafa & Tejumaiye (2010) performed a study in Turkey to investigate the influence of outdoor advertisements on consumers. The research sought to ascertain the degree to which outdoor ads influence customers living in the city of Sivas and assess the effects on participants' purchasing behaviour. The research also intended to define the unique characteristics of outdoor commercials in comparison to other advertising methods. A survey was conducted utilizing face-to-face interviews with a sample size of 400 persons. The selection of participants carried out using a non-random selection technique. The data underwent statistical analysis using a T-test, analysis of variance (ANOVA), and factor analysis. It found that people generally have positive opinions about outdoor advertisements. The findings also indicated that participants showed a good disposition towards outdoor advertisements since they believed that these advertising contribute to the diversity and attractiveness of the metropolitan environment, while also being ecologically conscious. A great segment of the populace had limited understanding of outdoor advertising. Additionally, this research demonstrated that outdoor advertisements, which provide a variety of ideas that effectively educate and convince folks while also being ecologically aware, are likely to be seen positively by consumers. Outdoor advertisements have proven to have a strong visual effect and their popularity is increasing, particularly among customers who have higher levels of education and income. The relevance of this study lies in its capacity to provide researchers with vital understandings regarding the perception of billboards or outdoor ads in a culture. This includes examining how the content sensitivity and effectiveness of these advertisements influence how consumers see them.

3.0 THEORETICAL FRAMEWORK

3.1 The Psychodynamic Theory

The hypothesis in question, as stated by Folarin (2015), was originally conceived by Sigmund Freud in the year 1900. The idea proposes that for a persuasive message to be deemed effective, it must successfully modify the psychological processes of the recipients in a manner that prompts them to explicitly adopt the behavioural model advocated by the communicator.

Psychodynamic theory is fundamentally a theory that pertains to behaviour. Moreover, this theory offers a crucial elucidation of how thoughts and experiences emerge in the subconscious minds of consumers. A communicator can only influence attitude or behaviour if they are capable of transmitting information that can be utilised by their audience to fulfil their needs. The purpose of utilizing digital billboards for Smartphone advertising is to capture the attention of the audience or customers and exert influence over their attitudes and behaviours, ultimately leading to the purchase of the product. The validity of this hypothesis in elucidating the study is unquestionable, since the audience possesses a wide range of perceptions regarding their exposure and will deliberately pick what they find appealing, captivating, and stimulating.

4.0 METHODOLOGY

The research methodology employed for this study is the survey design. The justification for the survey method comes from the fact that only a representative sample of the entire population is studied and findings generalized to the entire population. This is to say that the survey design is a perfect research method as using the survey approach allows for the study of a representative sample of the entire population, enabling the findings to be extrapolated to the entire population.

The study utilized a sample size of 427 respondents selected from three universities: University of Port Harcourt (UNIPORT), University of Benin (UNIBEN), and Rivers State University (RSU). Purposive random technique was used to select three universities; two federal government owned, and one state government owned. Simple random sampling technique is used for selecting 427 respondents as sample for the study. The purpose of this is to guarantee the inclusiveness of the sample, where each individual in the population has an equitable opportunity for selection for the study.

$$n = \frac{N}{(1 + Ne^2)}$$

The sample size for this study was determined using Taro Yamane method as given below;

$$n = \frac{N}{1 + N(e)^2}$$

Where;

n= Sample size

N= the population size (149,607)

e= is the level of precision. (0.05)

$$\begin{aligned}
 n &= \frac{149,607}{1 + 149,607(0.05)^2} \\
 &= \frac{149,607}{1 + 149,607(0.0025)} \\
 &= \frac{149,607}{1 + 349.0175} \\
 &= \frac{149,607}{350}
 \end{aligned}$$

n = 427

Source: (Yamane, 1967)

School	Population	Sample Size
University of Portharcourt	40,000	150
University of Benin	77,000	150
Rivers State University	29,939	127

The sum of the sample sizes is 427. This means data is to be collected from at least 427 people in order to be 95% confident that results are accurate within a margin error of 5%. Four hundred (400) participants responded while 27 questionnaires were lost in transit. The data in this study is presented using the tabular method. The tabular technique involves organizing research material in a systematic manner by presenting numerical facts, and figures in a series of boxes formed by rows and columns. Data is presented using basic statistical tables, including percentages and frequency counts.

Table 1: Responses on the Level of Influence Interactive Electronic Billboard Advertisements Have on Students’ Smartphone Purchase Choices

Responses	Frequency	Percentage%
Highly	97	24.3%
Extremely influential	173	45.5%
Partially	100	26.3%
Not influential at all	30	7.5%
Total	400	100 %

Source: Field Survey, 2024

Data in table 2 indicates that interactive electronic billboard advertisements are extremely influential on Smartphone purchase choices of undergraduate students as affirmed by the majority of the respondents.

Table 2: Responses on Type of Billboard that Generates Higher Immediate Engagement amongst Undergraduate Students.

Responses	Frequency	Percentage%
Interactive Electronic Billboards:	173	45.5%
Non-interactive Digital Billboards:	100	26.3%
Mobil Billboards:	39	9.8%
Traditional (Static) Billboards:	88	23.1%
Total	400	100 %

Source: Field Survey, 2024

The data on the table above shows a preference for Interactive Electronic Billboards. The inference is that electronic billboards generate higher level of immediate engagement, as confirmed by the majority of respondents.

Table 3: Responses to Areas of Interactive Electronic Billboard Advertisements that are Found More Engaging Than Non-Interactive Electronic Billboards.

Responses	Frequency	Percentage%
Dynamic Content and Visual Appeal	53	13%
Interactive Features and Technology Integration	195	51.3%
Real-Time Updates and Timely Messaging	113	35 %
Brand Recall and Aesthetics	39	9.8%
Total	400	100%

Source: Field Survey: 2024

Data presented in the table above indicates that 195 respondents, accounting for 51.3% of the total respondents, expressed interest in the interactive features and technology integration of interactive electronic billboards as affirmed by the respondents.

5.0 DISCUSSIONS OF FINDINGS

The research discovered that undergraduates exhibit a greater propensity to be actively involved with interactive electronic displays. Appealing to this technologically proficient demographic, the dynamic content and interactive elements may stimulate interest in promoted products and promote active engagement.

Electronic displays might exert more immediate influence on Smartphone purchasing choices, according to the study. When endorsing time-sensitive offers or the most recent Smartphone features, the inclusion of interactive elements, real-time updates, and vibrant visuals may enhance the persuasiveness of these advertisements.

Interactive electronic billboard is observed to elicit greater levels of engagement among undergraduate students due to their interactive functionalities and dynamic content. The tech-savvy demographic was captivated by the capability of the boards to exhibit dynamic messages, beautiful visuals, and interactive components. They might exert more impact on Smartphone purchasing choices, according to the findings of this study. Encouraging the promotion of particular product features or time-sensitive offers are facilitated by the incorporation of real-time updates, interactive elements, and vibrant visuals into the environment.

6.0 CONCLUSION AND RECOMMENDATIONS

In conclusion, this study makes a valuable contribution to the expanding field of understanding regarding the efficacy of the outdoor advertising, particularly the interactive electronic billboard in this digital era. It provides practical recommendations for advertisers who aim to understand the preferences of undergraduate students in the South-South region of Nigeria. With any luck, these results will stimulate further discussion and investigation in the domain, thereby promoting a more profound comprehension of the complex correlation that exists between advertising tactics and consumer conduct across various demographic settings.

To conclude, dialogue and research that will continually enrich our understanding of the complex interplay between advertising mediums and consumer behaviour in this specific context are invited.

With the conclusions drawn from this study, Advertisers and marketers targeting this particular demographic are advised to implement the following strategies:

1. Monitoring and Adaptation: Remain cognisant of developments in technology, shifts in consumer conduct, and prevailing trends. It is imperative to consistently assess the efficacy of conventional and digital billboard advertisements by implementing feedback mechanisms and analytics. Anticipate the need to modify advertising strategies in response to shifting consumer preferences and market conditions.

2. Incorporation of Interactive Elements: To augment electronic billboard advertisements, one may consider integrating interactive components, including but not limited to QR codes, augmented reality experiences, and gamified content. By doing so, it not only garners interest but also effectively captivates the audience, thereby cultivating a more lasting and influential advertising encounter.

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