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Product Intelligence and Buyers Behavior of Selected Mobile Phones in Nigerian Major Cities

Temitope Sunday OLOWE, PhD
Department of Marketing, Federal Polytechnic, Ado Ekiti, Nigeria
Joy Ifeoma ENEMUO, PhD
Department of Management, University of Nigeria, Enugu Campus, Nigeria.
Ben Etim UDOH, PhD
Department of Management, University of Nigeria, Enugu Campus, Nigeria

Abstract: *Over the years, the use of information technology has made it easier for organization to develop varieties of intelligent products which has led to adaptation to changes in the business environment, cooperation with other product freely. This study examined the relationship between product intelligence & consumer buying behavior of selected mobile phones in Nigeria. In relation to relation literature reviewed with scholars, this paper emphasizes more on the theories and empirical facts on product intelligence to reinforce the subject matter properly. It explains the relationship between product intelligence and buying behavior with the aid of the innovation attributes of relative advantage, compatibility, and complexity. The survey research design was adopted using questionnaire to obtain information from customers of the selected store. Data was obtained from the primary source. The result of this study revealed that consumers who perceive high functional or emotional value are accordingly willing to use their mobile phones in more ways, and may utilize the full spectrum of features.*

Keywords: *Product Intelligence, Buying Behavior, Innovation Adoption, Relative Advantage, Compatibility*

INTRODUCTION

Buying behavior is the study of the processes involved when individuals or groups select, purchase, use, or dispose of products, services, ideas, or experiences to satisfy needs and desires. This has numerous factors as a part of it which are believed to have some level of effect on the purchasing decisions of the customers. It is all about the set of activities which involves the purchase and use of goods and services which resulted from the customers' emotional and mental needs and behavioral responses. The buying behaviors of consumers in the world market varies tremendously depending on their culture, age, taste, preference, level of education, income and personality. In the face of competition in the world market, goods are produced and available is mass and most manufacturers adopt various marketing strategies to influence the behavior of their consumers around the world. In the digitalization era, rapid technological progress has enabled companies to widen their product portfolio globally and allowed new players to introduce radically new products, implement disruptive business models, and potentially establish novel markets (for an overview in the context of the internet of things (Decker and Stummer, 2017; Kannan and Li, 2017; and Wakenshaw, 2017). However, this development also

bears challenges, as practitioners lack reliable data about which smartness dimensions increase (or decrease) the consumption values of a product and how these affect product usage, thus making prediction of market behaviour difficult.

In the African market context consumer buying behavior are aspiration and hopeful when it comes to the influences of consumer decisions (Freudenthal & Mook,2003). They further stated that television and radio are ranked as the most important and trusted channels for consumers to make purchasing decisions in the African market. Sun and Zhang (2006) found out that Africans exhibit a loyal behavior to international brands as compared to locally made brands and this has affected infant industries in the home market. Specifically, Price is one of the major determinant of consumer buying behavior in Nigerian market. Most Consumers in Nigeria considers the price of certain product as compared to other related brands before making a purchase decision. Most consumers in Nigeria exhibit impulse and curiosity buying behavior. Therefore manufacturers of brand adopts various marketing and promotional strategies that can easily stimulate the interest of the consumers towards making a purchase decision

However, Product intelligence refers to collecting, examining, and acting on information about how users interact with their product (Ziuznys, 2022). It's mostly done by analyzing customer data to develop a better product and enhance user satisfaction. Furthermore, Organization can analyze customer reviews about their competitors' products and find a way to implement necessary adjustments to overcome the competition. User behavior data is one of the most important factors that come into play while trying to improve the product. For instance, one example could be the laptop industry. Every time a user interacts with a laptop, it collects behavioral data that allows the manufacturers to come up with new-and-improved features to alleviate some of the struggles and improve user experience. This type of customer data gives the brand direction and focus on the most important aspects that require more development. With the rise of e-commerce and the increasing impact of online touch points, and peer-to-peer influence within the path to purchase, the role of ratings and reviews is critical to generate authentic product intelligence. Product Intelligence is a consumer-centric approach that provides critical knowledge of products features that drive overall product satisfaction through the analytic combination of review text and star ratings. In addition, product intelligence is the main strategy that helps Apple stay competitive in the smart phone industry. Without it, they would be at serious risk of losing market share to competitors. Product intelligence is crucial because it drives customer loyalty. In fact, 74% of consumers report that the quality of a brand's products is the most important factor in keeping their loyalty. Several leading institutes and companies have also recognized that intelligent products will become important in the near future and set up specialized laboratories to conduct research on the integration of IT into new consumer products and people's living environment. The increasing importance of intelligent products has been previously recognized in the marketing literature. Watson et al. (2002) lay a conceptual foundation for thinking about future marketing based on ubiquitous networks. Physical products will be equipped with information and communication technologies and form extensions of these networks. As such, they may fulfill critical tasks in, for example, personalizing the communication between firms and their customers (Watson et al, 2002).

Despite the above developments, no empirical evidence currently exists on whether and how product intelligence affects consumer buying behavior. This paper intends to fill a part of this gap. First, i provide a conceptualization of product intelligence, based both on the literature and exploratory interviews with practitioners. Second, i develop a conceptual framework where we hypothesize that product intelligence influences consumer buying behavior through innovation attributes (e.g., Perceived complexity, perceived compatibility, and perceived related advantages). In light of the above, we hypothesize that product intelligence influences consumer buying behavior indirectly through its impact on the innovation attributes of relative advantage, compatibility and complexity. Thus,

$H0_1$: The relationship between product intelligence and consumer buying behavior is not mediated by perceived complexity

$H0_2$: The relationship between product intelligence and consumer buying behavior is not mediated by perceived compatibility

$H0_3$: The relationship between product intelligence and consumer buying behavior is not mediated by perceived relative advantage

So far, only a relatively small number of empirical studies have addressed adoption of smart consumer products. This research contributes to this stream of research in that it investigates another interesting smart product, namely, mobile phones, and in that it also examines brand effects for this smart product.

LITERATURE REVIEW

Conceptual Clarifications

Product Intelligence

Product intelligence can be seen an automated system for gathering and analyzing intelligence about the performance of a product being designed and manufactured, such that this data is automatically fed back to the product managers and engineers designing the product, to assist them in the development of the next iteration or version of that product. The goal of product intelligence is to accelerate the rate of product innovation, thereby making the product and its owners more competitive and increasing customer satisfaction. Product intelligence is often applied to electronic products, but it is not necessarily limited to electronic products (Freudenthal & Mook, 2003). The conceptualization of product intelligence views it as a second-order construct that is formed as a combination of the six intelligence dimensions (i.e., autonomy, ability to learn, reactivity, ability to cooperate, humanlike interaction, and personality). Thus, the dimensions are seen as defining characteristics of the construct (Jarvis et al. 2003) and it is changes in the dimensions that are expected to cause changes in the construct, not the other way round; an increase in any dimension (irrespective of whether it is accompanied by an increase in the other dimensions or not) will result in an increase in overall product intelligence.

Product intelligence indirectly influences consumer behavior, through the perceived innovation attributes of relative advantage, compatibility and complexity taken from the diffusion literature. Relative advantage is defined as the degree to which an innovation is perceived as superior to the idea it supersedes (Rogers, 1995). An innovation can be superior in terms of economic profitability, social prestige, convenience, or other benefits. Compatibility is the degree to which an innovation is perceived as consistent with existing values, past experiences, and needs of potential adopters (Rogers,1995). A product that is more compatible fits more closely with the individual's way of living than a product that is less compatible. The complexity of an innovation concerns the degree to which an innovation is perceived as relatively difficult to understand and use. Relative advantage, compatibility and complexity are the three most important (out of five) attributes from the innovation adoption literature that either positively (relative advantage, compatibility, observability and trialability) or negatively (complexity) affect the rate of adoption.

In this context, a meta-study by Tornatzky and Klein (1982) showed that only the innovation attributes of relative advantage, compatibility and complexity consistently influenced innovation adoption. Also, previous research showed that these three innovation attributes play more important roles for purchase intention and innovation adoption than observability and trialability (Plouffe et al., 2001). Moreover, observability and trialbility played an insignificant role for consumers that already gained experience in the use of a certain innovation (Plouffe et al. 2001). As such, we only consider the innovation attributes of relative advantage, compatibility, and complexity as relevant for our study. We expect product intelligence to influence consumer buying behavior through the innovation attributes of relative advantage, compatibility, and complexity because it is consumers' perceptions that eventually determine the emotional evaluation of a product and not the product characteristics (here, the intelligence dimensions) themselves. In the diffusion literature, for example, the perceptions of potential adopters determine whether an innovation will be adopted.

Reactivity

Reactivity is the third dimension of intelligence and refers to the ability of a product to react to changes in its environment in a stimulus/response manner (Bradshaw, 1997). A good example of a product that is reactive is the Philips Hydraprotect hairdryer. This hairdryer lowers the temperature of the air when the humidity of the hair decreases, thereby preventing damage to the hair caused by hot air. Reactivity can be distinguished from the ability to learn in that reactivity refers to instant reactions to the environment. In contrast to the ability to learn, no internal models of the environment are needed for these reactions and reactions are constant over time. In one of the expert interviews, a respondent addressed reactivity describing an intelligent product as "a product that observes something and takes action on the basis of that observation

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Ability to Cooperate

The fourth dimension of product intelligence is the ability to cooperate with other devices to achieve a common goal. According to Nicoll (1999), the age of discrete products may be ending. Instead, products are becoming more and more like modules with in-built assumptions of their relationships with both users and other products. An increasing number of products are thus able

to communicate not only with their users, but also among themselves (Nicoll, 1999). For example, desktop computers cooperate with other products; they can be attached to scanners, printers, musical instruments, video cameras and so on. Other obvious examples of products that can cooperate are mobile phones and PDAs. The user of these products can write emails on the PDA and send these via the mobile phone. One interviewee also observed that intelligent products are frequently able to cooperate: "Something that you see quite often in intelligent products is communication between separate products. One day it will be possible to interconnect all products".

Humanlike Interaction

The fifth dimension, humanlike interaction, concerns the degree to which the product communicates and interacts with the user in a natural, human way. Within the context of agents, Bradshaw (1997) speaks of 'knowledge communication ability' that refers to an agent's ability to communicate with persons and other agents with language resembling human-like 'speech acts'. Similarly, intelligent products are sometimes able to communicate with their users through voice production and recognition. For example, car navigation systems produce speech and some of them also understand speech. There is no need for users to push any buttons during driving and the driver is guided to his/her destination through a dialogue with the navigation system

Personality

The last dimension, personality, refers to an intelligent product's ability to show the properties of a credible character. This dimension was also distilled from the literature on software agents in which Bradshaw (1997) discusses the property of an agent to have a 'believable personality and emotional state.' Well-known examples of agents with personality are the paperclip- or Einstein assistants in Microsoft Office that suggest that 'someone' assists the users. Physical products can also be equipped with an interface that shows personality characteristics. Levels of personality vary from interfaces showing only a caricature face to interfaces with the ability to show emotions (Cassell and Thorisson, 1999). An example of an intelligent product in the marketplace with a high level of personality is Sony's AIBO that can be angry, happy or sad

Benefits of Product Intelligence

The benefits of product intelligence are endless. Here are some of the benefits of using product intelligence:

- **i.** Gives you control: From gauging how users feel about a product at a certain time to allowing them to submit feedback, product intelligence lets you control every aspect of the user experience.
- **ii.** Helps you build on boarding experiences users love: Product intelligence has powerful tools to improve onboarding and boost product adoption. From pushing users toward actions to announcing a new feature, organization can customize every experience to meet their goals.
- **iii.** Identifies consistent flaws: Product analytics helps organization identify flaws in the user experience, so they can create better experiences and solve problems before their next update.

iv. Reduces customer churn: By measuring user happiness, organization will be able to custom-tailor features to create the experience customers crave and reduce customer churn in the process.

v. Improves quality management: Tracking product development metrics gives companies greater control over quality management. This ensures that products are manufactured according to the precise specifications of product designers. Measuring product key performance indicators (KPIs) also gives companies more control over product quality.

vi. Accelerates product innovation: Product intelligence gives companies the insights they need to innovate consistently. When they always have a 24/7 view of how people use their product, they can make innovation a consistent priority instead of something that's done every so often.

vii. Helps product companies stay relevant: When companies don't focus on experience, they end up losing customers. Companies can use product analytics to make faster and better decisions, innovate products, and keep up with competitors. Product intelligence helps companies stay relevant by giving them the insights they need to evolve constantly.

Guiding Principles for Product Intelligence

To get the most out of product intelligence, there are some guiding principles digital teams should follow:

i. *Product teams must be collaborative and cross-functional*: While platforms and integrations are essential tools, great product experience comes from helping teams collaborate more effectively. This means that collaboration must be a top priority, not an afterthought. Modern product teams need to balance exploration, experimentation, and decision-making when working together to improve and create new products.

ii. *Product teams must have complete access to data:* To improve products and make better decisions, product intelligence can't be bound by information silos all data must be accessible. From analytics to experimentation to customer data and behavioral targeting, data must be available for all product teams to easily access, monitor, and use.

iii. *Usage tracking must be done ethically:* Product teams must be respectful of sensitive information and acknowledge customer concerns. This means being careful about what you track, how you track it, and what you use it for. Collecting and analyzing usage data to investigate patterns, opportunities, and trends is important for providing customers with the most value but make sure your team is protecting users by being transparent about what you track and how you track it.

Theoretical Review

This work anchors on Howard Sheath Theory. John Howard and Jagadish Sheth put forward the Howard Sheath model of consumer behavior in 1969, in their publication entitled, 'The Theory of buyer Behaviour'. The Howard Sheath Model is a sophisticated integration of the various social, psychological, and marketing influences on consumer choice into a coherent sequence of information processing. It aims not only to explain consumer behavior in terms of

cognitive functioning but to provide an empirically testable depiction of such behavior and its outcomes (Howard, 1977). The logic of the Howard Sheath model of consumer behavior summarizes like this. There are inputs in the form of Stimuli. There are outputs beginning with attention to a given stimulus and ending with purchase. In between the inputs and the outputs, there are variables affecting perception and learning. These variables are termed 'hypothetical' since they cannot be directly measured at the time of occurrence The Howard Sheath model of consumer behavior suggests three levels of decision making:

The first level describes extensive problem-solving. At this level, the consumer does not have any basic information or knowledge about the brand and he does not have any preferences for any product. In this situation, the consumer will seek information about all the different brands in the market before purchasing. The second level is limited problem-solving. This situation exists for consumers who have little knowledge about the market, or partial knowledge about what they want to purchase. In order to arrive at a brand preference, some comparative brand information is sought.
The third level is habitual response behavior. At this level, the consumer knows very well about the different brands and he can differentiate between the different characteristics of each product, and he already decides to purchase a particular product.

METHODOLOGY

Quantitative Survey research design was adopted. The information collected was analyzed and used to make decisions and generalization about the characteristics of the population from which the sample is selected. In this study the total population of the study encompasses customers of selected mobile phone stores in Ikeja, Enugu Metropolis and Ado Ekiti, Nigeria. The probability sampling method was adopted in this study with the aid of Simple random sampling as it allows selection of the sample size quickly and efficiently, it also makes the sample unbiased by using the system to select the sample. Information or data was obtained from the primary source of data collection. Primary data was obtained through the administration of questionnaire to the respondents. The research instrument used in this research work was Questionnaire. This questionnaire was divided into two parts. Part A and Part B. Part A comprises questions demanding for the respondents bio-data, while part B comprises questions related to the research objectives. The questionnaire consisted of the six scales measuring the product intelligence dimensions and respondents were asked to evaluate the product they owned on each of these dimensions. In addition, measures for relative advantage, compatibility, complexity, and consumer satisfaction were included in the research instrument. The advantage scale was adopted from Cooper and Kleinschmidt (1987) and consisted of five items. The concepts of compatibility and complexity were measured with five items each (based on Rogers 1995). This study gathered information's in relation to the research objectives and the data obtained was presented and analyzed using Statistical package for Social Science while the hypotheses formulated was tested using correlation coefficient method

RESULT

Hypotheses stated in this study was tested via correlation analysis. The results in Table 1 suggest several significant relationships between the examined variables. The results in Table 1 suggest several significant relationships between the examined variables.

CONSTRUCT	FUNCTIONAL VALUE	VARIETY OF USE
Autonomy Value	0.142	0.164
Reactivity Value	0.137	0.021
Multifunctionality Value	0.377	0.183
Functional value → Use		0.241
Emotional value → Use		0.689

*** $p < 0.001$; ** $p < 0.01$; * $p < 0.05$

Table 1. Estimated path coefficients

Findings with respect to the influence of product intelligence on consumer buying behavior indicate that perceived autonomy not only positively affects functional value but also affects the perceived emotional value (however, both results are subject to a relatively low significance level). The reason might be that autonomy enhances emotional experiences of usage. Interestingly, results regarding reactivity and multi functionality are in opposition to one another. Reactivity has a significant negative effect on functional value and no significant effect on emotional value. The negative effect of reactivity on the functional value might be explained through the notion of high complexity and the (potential) disturbance that comes with this mobile phones feature, which may reduce usability (Rijsdijk et al., 2007). Furthermore, reactivity seems not to deliver an emotional experience to customers. Multi functionality, on the other hand, strongly increases functional value, and it also increases the emotional value triggered by using the smart phones. Emotional experience also plays an important role, and, indeed, we observe a similar relationship for product usage. Consumers who perceive high functional or emotional value are accordingly willing to use their mobile phones in more ways, and may utilize the full spectrum of features.

CONCLUSION

The findings of this study revealed that more intelligent products are better adapted to their users. Just like human and animal intelligence are described as the ability to adapt to the environment, this also seems to be the case for intelligent products. Products that are able to interact with the user in a humanlike way are more compatible with existing mental frameworks of potential adopters; hence adopters have to put less effort in learning how to use these products. Also, products that are more autonomous, able to learn or reactive can be less demanding for users and approach a level of symbiosis in which interaction with their users becomes more natural or even invisible. Along with an increase in relative advantage and compatibility, product intelligence also moderately increases the complexity that consumers perceive. However, certain marketing techniques may reduce such complexity. Research shows, for instance, that using consumers'

existing knowledge structures in promotional messages facilitates consumer understanding (Gregan-Paxton and John, 1997).

Specifically, product intelligence has a positive impact on relative advantage and compatibility, which, in turn, both positively affect consumer buying behavior. These findings suggest that consumers appreciate products not for their intelligence itself, but because of the resultant relative advantage and compatibility they perceive in them. Product intelligence also positively influences perceived complexity, which, however, has a negative impact on consumer buyng behavior. This result suggests that consumers are less satisfied with products with a higher intelligence because of their complexity

This study result also indicated that Manufacturers of IT equipment believe new "product intelligence" analytic tools are a significant opportunity that will drive many new technical and business values for their customers. Also, in this day and age, consumers have more choices as they are more connected. From phones to tablets to watches, our screens are turning into experience snobs. It takes a lot to make someone like a product. A product either needs to make consumers more effective at work, entertain them, inspire them, or inform them. But if it doesn't, they'll quickly move on to something new. Loyalty must be earned. That's why companies are offering high-quality products that give consumers the experiences they want. They're competing to earn their loyalty. With product intelligence, they're able to use data to better understand consumers relationships with the products they love using.

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