# Journal of Marketing and Consumer Behaviour in Emerging Markets

University of Warsaw Faculty of Management

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# Contents

# The Use of Artificial Neural Networks (ANN) in Forecasting Housing Prices in Ankara, Turkey

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## ABSTRACT

The purpose of this paper is to forecast housing prices in Ankara, Turkey using the artificial neural networks (ANN) approach. The data set was collected from one of the biggest real estate web pages during April 2013. A three-layer (input layer – one hidden layer – output layer) neural network is designed with 15 different inputs to forecast the future housing prices. The proposed model has a success rate of 78%. The results of this paper would help property investors and real estate agents in developing more effective property pricing management in Ankara. We believe that the artificial neural networks (ANN) proposed here will serve as a reference for countries that develop artificial neural networks (ANN) method-based housing price determination in future. Applying the artificial neural networks (ANN) approach for estimation of housing prices

is relatively new in the field of housing economics. Moreover, this is the first study that uses the artificial neural networks (ANN) approach for analyzing the housing market in Ankara/Turkey.

## 1. INTRODUCTION

Between 2010 and 2015, Turkey had a 13.9% increase in GDP per capita with the average of 2.7% per year. The strong growing potential of the Turkish economy attracted both local and foreign investments which can be seen as different from house buying, opening a new business or entering the Istanbul Stock Exchange. The relation of GDP change between Turkey and the EU region is given in Figure 1.

**Figure 1**
GDP per capita (in US $) of Turkey and EU region
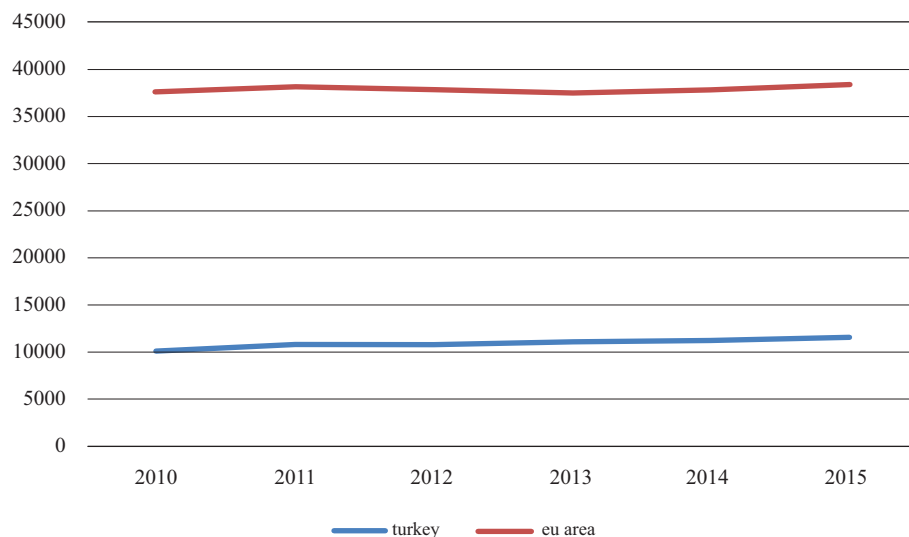


Over the last decade, Turkey has achieved rapid economic growth, accompanied by fast growth of the real estate sector. For instance, the real estate sector, which includes the housing sector, contributed 19.5 percent of the Turkish total gross domestic product (GDP) in 2013 (Turkish Statistical Institute, 2015). Factors that have been critical to the strong development of this sector include property rights and government policy.

With the opening up of the Turkish market to allow freehold ownership of properties for foreigners in Turkey, international investors have driven a huge demand for property. In April 2015, 1847 houses were sold, which is a 51% increase compared to the same month of 2 previous years (Turkish Real Estate Market Report, 2014).

Our study focuses on forecasting the future house prices in Ankara housing market by using artificial neural networks (ANN) with the data obtained from www.sahibinden.com, which is the biggest real estate web page in Turkey. Examining housing prices using the ANN model is relatively new in the field of housing market. Additionally, this study is the first to use the ANN model to analyze housing market in Ankara and in Turkey. The results of this work would help property investors and real estate agents in developing more effective property pricing management in Ankara. The artificial neural networks (ANN) proposed here will serve as

a reference for countries that develop artificial neural networks (ANN) method-based housing price determination in future.

The present paper seeks to contribute to this line of research by examining the issue for Turkey. Turkey is the 17th largest economy in the world and 6th largest economy in Europe with a GDP of approximately USD 786 billion. Between 2002 and 2012, the Turkish economy grew remarkably well at an average rate of 5.17 percent per annum (Turkish Statistical Center, 2014). In parallel, it witnessed a run-up in property market, especially in Ankara metropolitan area, the capital city of Turkey.

We organize the remainder of this paper as follows. The next section includes some information about Ankara housing market; the following section presents a literature review in housing market forecasting models and artificial neural networks model. In section 5, some interpretations of the results obtained are offered and in the final section, a summary is presented.

## 2. TURKISH HOUSING MARKET

Turkey has achieved rapid economic growth, accompanied with rapid development of the real estate sector. As a result of rapid economic growth, demand for urban land and new dwelling has increased swiftly, leading to rapid growth of housing prices.

For instance, the Housing Index in Turkey increased to 178.80 Index points in March 2015 from 175.16 Index points in February 2015. The Housing Index in Turkey averaged 147.71 Index points from 2002 until 2015, reaching an all time high of 1358 Index points in January of 2002 and a record low of 96.92 Index points in January of 2010. Figure 2 shows the Turkish House Price Index from January 2010 to September 2016 (Central Bank of the Republic of Turkey, 2016).

**Figure 2**
Turkish House Price Index from year 2010 to 2016
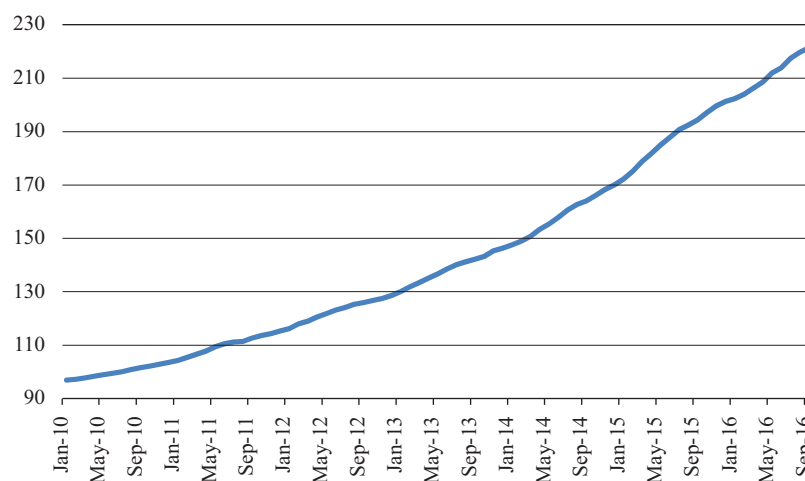


The housing market has increased substantially and also the construction industry has become one of the key elements in the Turkish economy, because of the government policy during the last decade. Figure 3 shows total house sales in Turkey by year. It depicts a significant jump from the 4th quarter of 2012 to 2013. In total, 2013 house sales have exceeded 2012 levels by 65%. And this increase continues in the following periods (Turkish Statistical Institute, 2016).

**Figure 3**
The total house sales in Turkey by month (thousand units)
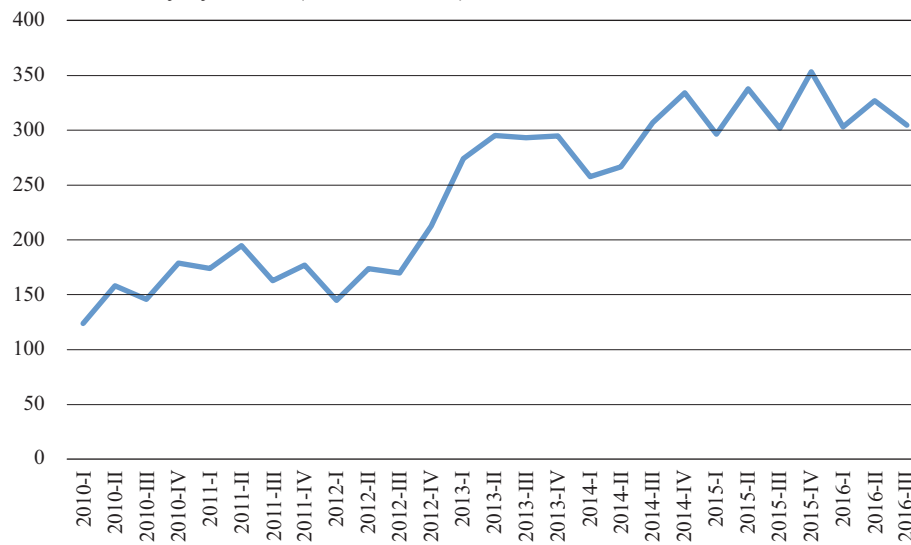


In May 2012, the government passed a bill to attract more foreign homebuyers. Since August 2012, the government has allowed nationals from 183 countries to buy properties in Turkey. In addition, the size of land foreigners can buy without needing a special permission increased from 2.5 hectares, to 33 hectares. Since then, tens of thousands of foreigners have successfully acquired properties in Turkey, most notably in the Marmara and Mediterranean regions, Turkey's major finance and tourist hubs. In 2015, Turkey's Foreign Direct Investment (FDI) inflow was at US\$ 16.5 billion, 24.8% of the total FDI (or US\$ 4.1 billion) was for real estate and construction, according to the Investment Support and Promotion Agency of Turkey (ISPAT) (www.globalpropertyguide.com).

Housing loan interest rates fell from about 48.43% in 2002 to just 9.7% in 2013. This led to a sharp rise in outstanding housing loans, despite periods when the economy was weak. Over the past decade, housing loans expanded from around 1.91% of GDP in 2005 to around 6.58% of GDP in 2015. Housing loans increased by an average of 27.9% annually from 2006 to 2015. In 2014, the average interest rate for housing loans rose again, and by September 23, 2016, the average interest rate was 12.07% (www.globalpropertyguide.com).

Ankara is the capital city of Turkey and has become Turkey's second largest city after Istanbul. Additionally, according to the report made by Turkish Statistical Institute in 2014, 5,150,072 people lived in Ankara in 2014. According to Port Turkey news, the number of large-scale housing projects continues to increase in Ankara. As a consequence of allowing both internal and external migration, forecasting housing prices in Ankara is becoming an important issue for potential property investors. House price and house sales information about Ankara is given in Table 1.

**Table 1**
House Price Index and sales of houses in Ankara

|  | House Price Index | Sales of Houses |  | House Price Index | Sales of Houses |  | House Price Index | Sales of Houses |  | House Price Index | Sales of Houses |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Jan-13 | 123.62 | 11215 | Jan-14 | 137.60 | 10141 | Jan-15 | 152.16 | 9570 | Jan-16 | 171.59 | 9012 |
| Feb-13 | 125.01 | 11281 | Feb-14 | 139.11 | 9386 | Feb-15 | 154.19 | 11063 | Feb-16 | 172.20 | 10694 |
| Mar-13 | 126.81 | 12291 | Mar-14 | 141.10 | 10693 | Mar-15 | 157.02 | 14105 | Mar-16 | 172.59 | 12730 |
| Apr-13 | 128.61 | 11889 | Apr-14 | 141.99 | 9249 | Apr-15 | 158.80 | 14001 | Apr-16 | 173.48 | 11843 |
| May-13 | 129.93 | 12638 | May-14 | 143.69 | 11004 | May-15 | 161.02 | 12816 | May-16 | 176.26 | 11408 |
| Jun-13 | 131.29 | 11692 | Jun-14 | 144.74 | 10437 | Jun-15 | 162.31 | 12869 | Jun-16 | 177.55 | 11695 |
| Jul-13 | 132.10 | 12428 | Jul-14 | 146.68 | 9426 | Jul-15 | 163.83 | 10722 | Jul-16 | 178.73 | 7955 |
| Aug-13 | 132.64 | 9636 | Aug-14 | 147.64 | 11836 | Aug-15 | 165.66 | 13139 | Aug-16 | 178.74 | 12300 |
| Sep-13 | 133.28 | 12206 | Sep-14 | 148.78 | 12615 | Sep-15 | 166.69 | 9810 | Sep-16 | 181.35 | 11564 |
| Oct-13 | 134.22 | 8231 | Oct-14 | 150.53 | 10549 | Oct-15 | 169.02 | 11028 |  |  |  |
| Nov-13 | 135.78 | 11981 | Nov-14 | 151.39 | 11695 | Nov-15 | 169.77 | 11368 |  |  |  |
| Dec-13 | 136.35 | 12285 | Dec-14 | 152.07 | 14794 | Dec-15 | 170.86 | 16046 |  |  |  |

Data used in the study have been obtained from the data of the online marketplace "www.sahibinden.com" regarding the residences being sold in the pilot study area for the period between December 11, 2011 and April 23, 2012. This online market platform (www.sahibinden.com) founded in 1999 in Turkey is one of the first websites that provide ad search opportunities via the internet. Since its foundation, this website has been the most frequently visited ad and shopping platform of Turkey. On the other hand, five-year neighborhood- and district-level population data obtained from the Turkish Statistical Institute has been used to observe the population development in the study area.

Ankara is divided into nine districts (Yenimahalle, Cankaya, Kecioren, Sincan, Golbasi, Etimesgut, Mamak, Altindag, Akyurt), which are given in Figure 4. In Yenimahalle, Cankaya and Kecioren districts, house is known as a capital good, so house prices in these districts are high. House prices in Golbasi and Sincan districts are average; house prices in Etimesgut, Mamak, Altindag and Akyurt districts are low.

**Figure 4**
Ankara's districts



## 3. LITERATURE REVIEW

Much research has been conducted on the factors affecting housing prices and relations between them. An analysis of the housing market and housing price valuation literature indicates two principal research trends: the use of the ***hedonic-based regression approach*** (Lancaster, 1966; Brown and Rosen, 1982; Rabiega et al., 1984; Stevenson, 2004; Shimizu, 2010) which has been adapted to the housing market by Rosen, and this approach is commonly used as an assessment tool for the market analysis. In recent years, the second trend, ***artificial intelligence techniques***, has been used as an alternative tool to model systems of conventional property value (Kuşan et al., 2010). Chen et al. (2007) forecasted housing prices under different submarket assumptions in the city of Knoxville and vicinities. Piazzesi et al. (2007) created a consumption-based asset pricing model where housing is explicitly modeled both as an asset and consumption good. There has been a little amount of literature on the use of artificial intelligence techniques to analyze determinants of house prices. Some of these studies include: Yan et al. (2007), Selim (2007), García et al. (2008), He et al. (2010), Kuşan et al. (2010), Tayyebia et al. (2011), Azadeh et al. (2012), Park and Bae (2015) (Table 2). These studies are conducted following artificial intelligence techniques like neural network and fuzzy linear regression and employ as many variables as possible to capture the main determinants of housing prices in different countries.

There a few studies related to both Turkish real estate market and its pricing that use econometric models to analyze the effects of house pricing.

Yuksel (2016) analyzed the relation between stock and real estate prices in Turkey by using threshold error-correction model. That author compared the effect of pre-crisis and crisis periods using daily Real Estate Investment Trusts Index, stock market index and interest rate data within the framework of a vector error correction model.

Kaya and Atan (2014) used a hedonic price model on the data of house price index obtained from the Central Bank of Turkey. Their study shows that, for the period between December 2010

and June 2012, under the constant housing features, hedonic price indexes are calculated as 6.21% for Turkey, 5.93% for İstanbul, and 5.05% and 2.83% for Ankara and İzmir respectively.

Coskun and Ertugrul (2016) analyze volatility properties of the house price returns of Turkey and Istanbul, Ankara and Izmir provinces over the period of July 2007–June 2014 using conditional variance models.

In recent years, the ANN approach has been used as an alternative tool to model systems of housing prices determination. This study will employ the ANN approach to evaluate the major determinations of housing prices in Ankara. Related studies including artificial neural networks and house pricing are given in Table 2.

**Table 2**
The studies related to artificial intelligence techniques in housing market sector

| Author(s) | Journal | Artificial Intelligence Analysis Techniques |
|---|---|---|
| Yan et al., 2007 | Systems Engineering | TEI@I |
| Garcia et al., 2008 | Neurocomputing | Artificial neural network and geographic information system |
| Selim, 2009 | Expert Systems with Applications | Hedonic regression and artificial neural network |
| He et al., 2010 | Procedia Environmental Sciences | Wavelet transformation, hedonic regression |
| Kusan et al., 2010 | Expert Systems with Applications | Fuzzy logic |
| Tayyebia, et al. 2011 | Landscape and Urban Planning | Neural networks, geographic information system and radial parameterization |
| Azadehet, al. 2012 | Expert Systems with Applications | Fuzzy linear regression |
| Park and Bae, 2015 | Expert Systems with Applications | Decision trees, classification |

## 4. ARTIFICIAL NEURAL NETWORKS (ANN)

ANN is a part of machine learning where you can train the user design network to learn a process like forecasting, classification or other rule-based programming. Generally, it is a copy of human brain for information processing and computing. Like our brains, ANN uses artificial nerves and links them together to simulate the capability of a biological neural network. The most significant property of ANN systems is that they can learn from sample data sets like brains, and have the ability to make decisions according to this learning process (Tosun, 2012).

ANNs have been applied to different fields like linear, nonlinear or even nonparametric problems. The basic element of the ANN is called neuron, which is the processing unit that forms a larger network. In regression or forecasting to train a multilayer network, a back-propagation learning algorithm is widely accepted and used. This learning algorithm is preferred to train the network with gradient search to minimize the square of errors between realized and targeted outputs (Pendharkar and Rodgre, 2003).

Generally, a multi-layer perception type of ANN which has three different layers (input, hidden and output layers) is widely used in literature. This type of ANN is fully connected, which means each node (neuron) is connected to every neuron in the next and previous layer. Each layer has a different number of neurons determined by the decision maker. The input layer is the first stage which allows inputs to enter from environment into the network. The output layer transmits the output to the environment. And the hidden layer occurs between the two outer layers. The hidden layer establishes linkages (with a selected transfer function) between input and output layers and provides the generalization of the network (Özdemir and Tekin, 2009; Örkcü and Bal, 2011).

The connections between the neurons of consecutive layers create the processing abilities of any ANN. Each layer has neurons linked together with different weights. These weights are calculated by a trial-error process (known as learning) which aims to minimize the error between the output value and the desired value. By selecting a suitable set of connecting weights and transfer functions, an ANN can learn to achieve a given task.

**Figure 5**
A neural network model
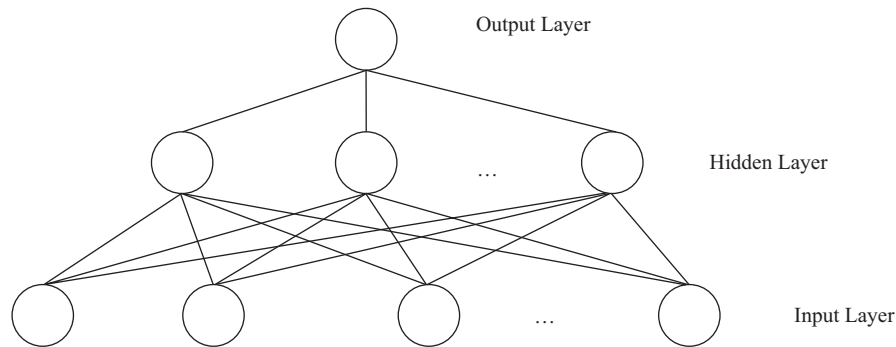


Generally, for each input variable in the dataset, there is one corresponding node in the input layer. The number of nodes in the hidden layer determines the complexity of the network model and needs to be empirically determined to best suit the data considered. While larger networks easily overfit (in other words, memorize) the data, too few hidden layer nodes can hinder learning of an adequate separating region. Although having more than one hidden layer provides no advantage in terms of nature of forecasting accuracy, it can in certain cases provide for faster learning (Pendharkar and Rodgre, 2003).

A back propagation neural network is widely preferred for prediction or classification of problems (Liang and Wu, 2005). Therefore, this algorithm is used in this study.

In the back propagation algorithm, the related input data are repeatedly presented to the neural network. The output of the neural network is compared to the targeted output and an error is calculated for each iteration. This error is then back propagated to the neural network and used to adjust the weights so that the error may decrease with each iteration and the designed model gets closer and closer to produce the desired output. This learning process is known as training (Wu et al., 2006).

Using the learning rules, the weights are iteratively changed to reach the best weight values which provide the most satisfactory outputs. This can depend on min MSE (min squared error) or other user-defined performance indicators. The network with the best performance measure is accepted as the best network. For obtaining the best network structure, many trials are needed in order to find the best numbers of hidden layers and the best numbers of neurons in those layers (Tosun, 2012).

ANN provides many advantages to decision makers, especially for complex problem solutions. They not only have ability to learn from sample sets, but their results can also be generalized to other data sets. A learned ANN can do the same tasks for other similar data sets. They can be especially powerful when the underlying data relationship is unknown. Noisy or imprecise data or even complex and non-linear data sets do not prevent the learning process. Hence, ANN is used in a wide range of applications in business management practices (Özdemir and Temur, 2009).

One of the most important features of neural networks is their ability to learn and generalize from a set of training data. After the training phase, a network establishes correlated patterns between input data sets and its corresponding targets. Thus, a well-trained network can be used to predict the outcomes of new independent input data (Jha, 2007).

One major disadvantage of ANN is that it is impossible to know the effect or the relationship between the inputs and the outputs with certainty, where the connection weights in the network do not indicate which input has more or less effect on the outcome of the network. In other words,

one can consider ANN as a black box that supplies good outcomes without indicating how or why. Apart from defining the general architecture of a network and perhaps initially seeding it with a random numbers, the user has no other role than to enter the inputs and watch the network train by itself and await the output. Another limitation of ANN is finding the right topology for the network, most importantly choosing the number of the hidden nodes, the initial weights for the connecting paths, and the proper learning algorithm with its parameters (Rao and Ali, 2002).

## 5. NETWORK DESIGN AND APPLICATION

Generally, before training a neural network, a decision maker must decide on the network properties by specifying the number of neurons in the input layer, the number of hidden layers (one or more layers), the number of neurons in each hidden layer, and the number of neurons in the output layer (Emrouznejad and Shale, 2009).

There are no certain rules to define the right or proper number of hidden layer units. Network design is a trial and error process. The initial values of the weights may also affect the resulting accuracy. Once a network has been trained and its accuracy is not considered acceptable, the training process should be repeated with a different network topology or a different set of initial weights (Emrouznejad and Shale, 2009).

A three-layer (input layer – one hidden layer – output layer) neural network is used for the study. For ANN, a program is written in Matlab by using Neural Network Toolbox. In this study, the output is the price of the houses and inputs are the variables used to forecast the house price. The variables used in the study with their descriptive statistics are given in Table 3. Thus, there are fifteen neurons in the input layer and one in the output layer. These variables are selected from the database based on the opinions of real estate agencies or marketing specialists. According to these experts, the main criteria reflecting the buying or renting decision of the customers are selected.

The age of home variable is given in groups on the web site. Therefore, we give numbers for each group: 0 for a new building, 1 if the age is 1–4, 2 if the age is 5–10, 3 if the age is 11–15, 4 if the age is 16–20 years and 5 if the building is 20 years or older.

**Table 3**
Variables, minimum, maximum and mean values

| Variables | Definition of the variables | Min | Max | Mean |
|---|---|---|---|---|
| Price | Value of the home in TL | 15,000 | 1,050,000 | 129,770.37 |
| Size | Size of the home in square meters | 50 | 571 | 126.96 |
| Rooms | Number of rooms | 1 | 8 | 4.09 |
| Bathroom | Number of bathrooms | 1 | 4 | 127 |
| Floor | Floor at which the home is located | 0 | 18 | 4.34 |
| Parking | 1 if there is a parking place for cars | 0 | 1 | 0.64 |
| Age | Age of the home | 0 | 5 | 1.49 |
| Elevator | 1 if there is an elevator | 0 | 1 | 0.32 |
| Heating | 1 if there is central heating | 0 | 1 | 0.92 |
| Location | 1 if the home is in or near the city center | 0 | 1 | 0.40 |
| Site | 1 if the house is in an apartment complex | 0 | 1 | 0.15 |
| Insulation | 1 if the house/building has an insulation | 0 | 1 | 0.56 |
| Kitchen | 1 if the kitchen has kitchen cabinets | 0 | 1 | 0.14 |
| Home-Floor | Floor of the house. 1 if hardwood, 2 if laminate and 0 if vinyl covering | 0 | 2 | 1.52 |
| Road | 1 if near the main city roads | 0 | 1 | 0.53 |
| Subway | 1 if near a subway station | 0 | 1 | 0.08 |

For a better classification, the data is normalized to [0, 1] by using the equation below:

$$X_{normalized} = \frac{X - X_{min}}{X_{max} - X_{min}} \qquad (1)$$

There are 1500 observations in the dataset. In the study, the dataset is divided into three parts randomly: 70% is used for training the network and remaining data is divided equally for testing and validation. In order to find the optimum number of neurons in the hidden layer, a simple experimental design is used. First, the training process was started with a network of five neurons in the hidden layer and this network is run 15 times. Then, this process was repeated for an increased number of neurons in the hidden layer of up to 20.

The most effective neuron numbers are chosen according to the performance measure. In this study, the mean square error (MSE) is taken into consideration as a performance measurement. The selection of the best ANN system depends on the value of MSE. The minimum MSE found through the experiment is 0.0023, which occurs in 4 different network structures (number of hidden neurons of 6, 12, 14 and 15). The best network is chosen on the basis of both CPU time and the coefficient of regression. The network with 12 hidden neurons has the coefficient of regression of 0.7878. The results of the best network after the training process are seen in Table 4.

**Table 4**
Training results

| | | Training Results |
|---|---|---|
| | Network architecture | 15 – 12 – 1 |
| Best Network | Activation function | logsig/linear |
| | Training algorithm | Levenberg-Marquardt |
| | Minimum MSE | 0.0023 |

The best network has 15 neurons in the input layer, 12 neurons in the hidden layer and one in the output layer. For hidden layer log sigmoid and for the output layer pure-linear, transfer functions are used. Levenberg-Marquardt algorithm is used for the training.

## 6. CONCLUSION

In this study, an artificial intelligence based decision support method is proposed for estimating housing prices. This method aims to help decision makers to analyze the market structure and compare the recent prices with their findings. In the model, 15 different inputs, from house price to its location, are used for the inputs. The output of the system is the future price of houses.

The aim of this study is to provide a decision tool for decision makers in the very complicated housing market for both real estate firms and final consumers. Buying a house or using a mortgage is a very difficult opinion for most people. A proper price forecast can be very helpful for future references. Thus, the proposed method can be utilized to ease the decision making process. This utilization is of interest particularly for both property investors and final consumers.

Perhaps the main limitation of this study is the selection of input and output variables. Comprehensive literature research is done for this purpose. But it should be known that selecting different variables can affect the outcome of the forecasts. This effect can be analyzed in further studies.

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# Quality Attribute and Customer Satisfaction: Using Kano's Model to Prioritize What Matters Most to Customers

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## ABSTRACT

Continuous innovations of smartphone attributes and increasing product usage call for better understanding of the attributes that matter most to customers. This study employs Kano's model for classifying smartphone attributes into various categories and examines the influence of those attributes on the satisfaction of smartphone users. Based on consumer evaluation of the latest and general smartphone attributes, the analysis in this study indicates various levels of satisfaction and dissatisfaction with each attribute. Specifically, our findings reveal merely three categories of Kano's classification, and 'one-dimensional' or performance attributes have higher influence on customer satisfaction as compared with 'attractive' ones. These findings provide implications for further product improvement efforts to consider not only technological capabilities but also to prioritize the attributes that are highly expected by customers. The majority of the respondents in this study include the younger consumer segment and heavy smartphone users, thus limiting generalization of the results to other contexts. Further research should consider respondents across segments and/or in a specific market, and extend the focus beyond product attributes so as to include user experiences and explicit product benefits.

## 1. INTRODUCTION

The convergent computer, communications and internet technologies lead to boundless innovations of consumer electronic products. A notable example is the continuous innovation of product and service attributes of smartphones. Smartphone evolved from merely a voice communication tool, known as 'mobile phone' in the early 1990s, into a multipurpose personal communications device. Convergent technologies have increased not only the functionalities of smartphone but also users' dependence on the device in their daily lives. With rapid adoption of smartphone across the world, many companies now understand that providing various

attributes or functionalities in a single product can guarantee its market success. However, do the continuously introduced smartphone attributes and its functionalities meet customer expectations or even are they desirable by most customers? Berthon et al. (2005) argue that innovators view technology as an enabler for the development of new products while marketing tends to view technology as 'a means to an end'. Both views reflect the importance of technology for product development; however, understanding customers remains a central focus of marketing activities. For a technology-oriented product, it is reasonable for new product development to be 'feasible' at the outset, and with the right 'insights' of customer requirements, the product is further developed to be more desirable, i.e. by enhancing its attributes and functionalities. In other words, the success of a product is viewed as a function of technological capabilities and a deeper understanding of customer requirements and expectations. From the marketing perspective, meeting customers' requirements and exceeding their expectations are prerequisites for high customer satisfaction and loyalty.

As the smartphone market has become increasingly saturated, it is becoming more critical for companies to meet customer expectations in product development efforts and identify what attribute matters most to customers. Understanding customers, who they are and what they want is part of the studies known as the voice of customers (VOC). VOC is normally conducted at the start of a new product, process or service design and typically includes identifying a set of detailed customer requirements and summarizing them into a hierarchy where each requirement is prioritized according to its importance to customers (see Griffin and Hauser, 1993). Customer requirements often include product attributes that satisfy various needs; a product or service is likely to be more desirable when it fulfills more than one requirement or 'need'. Customer requirement is dynamic and context-dependent; for example, new attributes that excite customers today will eventually shift to being merely an expected requirement of the product or service, and the importance of each attribute also tends to vary across customers. Thus, it is important for companies to update their understanding of customer expectations to ensure continuous success of any new and/or enhanced product attribute.

The main purpose of this study is to explore the relationship between the quality attribute and customer satisfaction. It employs Kano method for classifying smartphone attributes into various categories and further examines the influence of those attributes on the satisfaction of smartphone users. Kano's method is commonly used for defining new product attributes; however, an analysis of the recently introduced attributes is also valuable for further product enhancement, i.e. to prioritize the importance of each attribute from the customer's perspective. This analysis would allow future technological capabilities to consider attributes that are highly expected by customers. Although the importance of various smartphone attributes may vary across its users, there is increasing customers' dependence on smartphone in their daily lives. This necessitates a deeper understanding of what attributes matter most to customers. The remaining parts of this paper are as follows; section two reviews existing literature on Kano's model; section three discusses data collection and descriptions of Kano's classification method; section four provides discussions of our findings; and finally, section five discusses conclusions of the study and provides directions for further research.

## 2. LITERATURE REVIEW

Different terminologies of 'needs', 'wants', 'features', 'requirements', 'benefits' or 'attributes' are sometimes used interchangeably across marketing, engineering and industrial design literatures (see Bayus, 2008). Krishnan and Ulrich (2001) indicate that a useful representation of a product is a vector of attributes which also include customer needs, requirements, product specifications and technical performance metrics. Sanders and Dandavate (1999) indicate that

a thorough understanding of customer requirements and expectations requires researchers to learn about customers' memories as well as their current and ideal usage experiences. In this regard, development of new or enhanced product attributes requires efforts to listen to what customers say, interpret what they express and make inferences about what they think, observe how they use a product or service and 'uncover' what they know. These efforts form the basis of VOC studies and information is normally gathered from observations, interviews, focus groups, surveys and questionnaires. Griffin and Hauser (1993) argue that customer needs or requirements are a description of the benefits desired by customers. From a company's perspective, the focus is often on new and enhanced product attributes; however, from a customer's perspective, the main concentration is on the explicit benefits or the functionalities of those attributes. Thus, new development of smartphone attributes should consider 'what technology can do' as well as 'what matters to customers'. Kano's model focuses on addressing quality attributes in the perception of customers; thus, it provides insights for the developments of new or enhanced product attributes.

Kano's model is widely cited in the analysis of the relationship between product attributes (or quality) and customer satisfaction, e.g. Yang (2005), Nilsson-Witell and Fundin (2005), Shahin and Zairi (2009), among others. Figure 1 illustrates Kano's model; on the horizontal axis, the model shows the degree to which a particular product or service meets quality attributes as expected by customers, ranging from complete fulfillment to non-fulfillment of an attribute. The vertical axis indicates the level of customer satisfaction ranging from low to high; it reflects customer satisfaction levels regarding a specific product attribute that meet his or her requirements. Within the two dimensions, Kano proposes four different categories of attribute – *must-be, one-dimensional, attractive* and *indifferent*.

**Figure 1**
Kano's Model of the Relationships between Fulfillment of Product Attribute and Customer Satisfaction (adapted from Berger et.al, 1993)
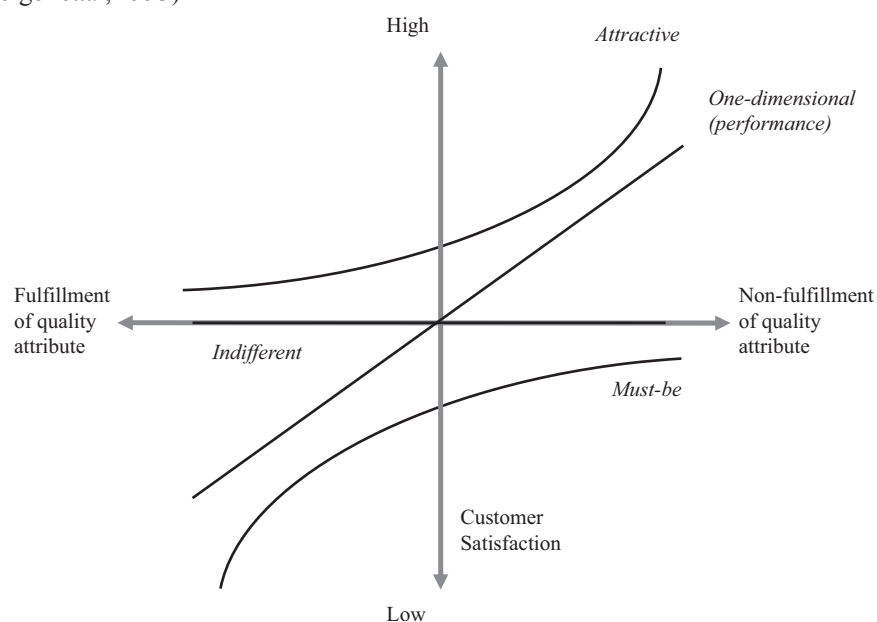


The first category (bottom curve) is called *must-be* or basic attributes; these product attributes must be satisfied and must be of high quality as demanded by customers. Complete fulfillment of these requirements cannot increase customer satisfaction but if they are not fulfilled, the product or service will be rejected. The second category (middle curve) is known as *one-dimensional* or performance attributes and represents requirements which have a linear relationship with customer satisfaction. These requirements are normally addressed by considering inputs or requests from customers for product improvement purposes. The third category (upper curve) is

called *attractive* or exciting attributes, and represents requirements that customers do not expect to be satisfied. However, if these attributes are addressed, customers are delighted, thus a higher level of satisfaction; if not, it will not cause dissatisfaction. There are also attributes the presence or absence of which does not make a real difference to customer satisfaction. These attributes fall along the middle of satisfaction level (where the horizontal axis intersects it) and are referred to as *indifferent* attributes. A '*reverse*' attribute is considered as the opposite of *'one-dimensional'* attribute; it decreases satisfaction if fulfilled, and increases satisfaction if not fulfilled, thus it is not considered in our analysis.

Kano's model is adopted and modified by researchers in a wide range of industries, for example the applications of the model in the airlines sector by Shahin and Zairi (2009), web-community service attribute by Kuo (2004), teaching attribute by Chien (2007), among others. In the most recent research, Song (2016) focuses on Kano's wording and its impact on smartphone attributes classification. Advantages of classifying smartphone attributes based on Kano's model include better understanding of these attributes, i.e. attributes that have the greatest influence on customer satisfaction can be identified. Classifications of product attributes into *must-be*, *one-dimensional*, *attractive* and *indifferent* categories are useful for new product development and/or further enhancement of these attributes based on their influence on customer satisfaction. *Indifferent* and *must-be* attributes do not lead to high customer satisfaction and are more critical during the outset development of a new product as compared with the improvement of its attributes. Lee et al. (2013) note that *must-be* attributes are basic customer expectations and are often taken for granted in evaluating product performance. *Must-be* attributes are the minimum product requirements; a product or service that merely satisfies basic requirements and/or meets standard performance criteria is often perceived as mediocre and cannot lead to high customer satisfaction and loyalty. Given a saturated smartphone market, companies tend to compete by introducing the most advanced attributes enabled by the latest technologies to attract customers and increase product usage. However, not all of new attributes are expected or desirable by customers. As this study focuses on the general and most recent smartphone attributes, we expect the following:

> *Hypothesis 1: Consumer evaluation of smartphone quality attributes will merely reflect the three categories of Kano's classifications, i.e. one-dimensional, attractive and indifferent.*

One of the commendable features of Kano's model is that it provides valuable benefits in trade-off situations during the product improvement stage. For example, if *one-dimensional* or *attractive* attributes cannot be met simultaneously due to technological constraints or financial reasons, the attribute which has the greatest influence on customer satisfaction can be identified and prioritized (see Shahin et al., 2012). Moreover, Kano's model has no technical limitations regarding the number of attributes to be included in any study. This is particularly useful for a technology-oriented product such as smartphone that is used as a multi-purpose communication device and subject to boundless innovations of its attributes. At the maturity stage of a product life cycle, discovering and fulfilling customer requirements for *one-dimensional* and *attractive* attributes of a product or service will create a wide range of possibilities for differentiation strategies. In a highly saturated smartphone market, it is more crucial to focus on *one-dimensional* and *attractive* categories as they have greater influences on customer satisfaction. Although the importance of smartphone attributes may vary across users, identifying *one-dimensional* and *attractive* categories reveals specific attributes that guarantee the optimal level of satisfactions. In this study, the quality attributes reflect the general and latest smartphone attributes which are made possible by technological capabilities such as convergent technology; therefore, we expect the following:

*Hypothesis 2: Customer evaluation of smartphone attributes will equally reflect one-dimensional and attractive attributes.*

Kano's model directly deals with customer requirements and acknowledges that customer needs and expectations evolve; an *attractive* attribute today will eventually shift to being a *one-dimensional* attribute and over time will become a *must-be* or basic requirement. For example, short messaging service (SMS) was perceived as an *attractive* service attribute in the 1990s; in the 'convergent era', text message is now considered as merely a basic requirement for many people. Apart from providing useful insights on the evolutionary aspect of customer requirements for a product, Kano's model also serves as a useful tool for classifying and prioritizing attributes that have greater influence on customer satisfaction. It basically stipulates that *one-dimensional* and *attractive* categories have greater influence on customer satisfaction; it is worth identifying which category has greater influence on satisfaction as well as the extent of their influence on customer satisfaction. Despite various new smartphone attributes enabled by the latest technologies such as 3D functions and multi-tasking, we presume that attributes that are associated with enhancing user's productivity and usage experience such as processing speed and internet speed have higher influence on customer satisfaction. Thus, we expect the following:

*Hypothesis 3: One-dimensional or performance attributes have higher influence on customer satisfaction than the attractive smartphone attributes.*

To sum up, evolution of technologies and customer needs or product requirements calls for dynamic frameworks such as Kano's model in order to capture the importance of VOC with regard to product innovations. Specific quality attributes and the extent of their influence on customer satisfaction can be analyzed through various research methods such as implementing Kano's survey. To enhance the effectiveness of Kano's survey, it is important for the respondents to be familiar with the method before the survey is conducted. This is because the questionnaires in the survey normally consist of two sections of functional and dysfunctional forms, i.e. *how do you feel if a certain attribute is present in a product or service*, and *how do you feel if the attribute is not present in a product or service?* These two sections concern customer response about including (functional question) or omitting (dysfunctional question) an attribute, and this might be confusing for respondents who have never heard of Kano's method. In addition, the wording of the questionnaires should be crystal clear and reflect a specific attribute of the product under study. Thus, a brief introduction to Kano's model and the methodical design of the questionnaires is critical to facilitate more reliable responses. Some researchers such as Nilsson-Witell and Fundin (2005), Mikulic and Prebazac, (2011) and Song (2016) modified the questionnaire design to reduce the interference between functional and dysfunctional questions. This paper employs Kano's approach for classifications of product or quality attributes; our questionnaires are designed to reflect the general and latest smartphone attributes and customer satisfaction.

## 3. METHODOLOGY

Kano et al. (1984) classify various product attributes into *'must be', 'one-dimensional', 'attractive', 'questionable', 'reverse'* and *'indifferent'* categories. Figure 2 shows Kano's method using a structured questionnaire consisting of pairs of questions for product or service attributes. The example of functional and dysfunctional questions (top left side of the figure) reflects one of the questionnaires used in our survey on smartphone attributes. Following Kano's method, one question in the pair asks about the customer's feelings in the case of fulfillment of an attribute, or a "functional question", and the other question asks about customer's feelings for non-fulfillment

of a smartphone attribute, or "dysfunctional question". For example, if a respondent answers "I like it that way" as regards the functional question of "If the call connections of your smartphone are good, how do you feel?"; and "I dislike it that way" as regards the dysfunctional question of "If the call connections of your smartphone are bad, how do you feel?", the combination of his or her response will be categorized as '**O** = One-dimensional or performance' attribute based on Kano's evaluation table at the bottom of Figure 2. This indicates that call connectivity is a one-dimensional attribute, i.e. more improvement of this attribute performance will lead to higher level of the respondent's satisfaction. A similar process is repeated for all answers of the respondents. The next step is calculations of frequencies for every response in order to provide the final classification or category of all smartphone attributes. The classification results are discussed in the findings section.

**Figure 2**
Kano's method, adapted from Berger et al. (1993)



| Functional form of the question | If the call connections of your smartphone are good, how do you feel? | 1. I like it that way<br>2. I expect it that way<br>3. I am neutral<br>4. I can tolerate it that way<br>5. I dislike it that way |
|---|---|---|
| Dysfunctional form of the question | If the call connections of your smartphone are bad, how do you feel? | 1. I like it that way<br>2. I expect it that way<br>3. I am neutral<br>4. I can tolerate it that way<br>5. I dislike it that way |

| Customer requirement, i.e. smartphone attributes | | Answer to dysfunctional (negative) question | | | | |
|---|---|---|---|---|---|---|
| | | Like | Expect | Neutral | Tolerate | Dislike |
| Answer to functional (positive) question | Like | Q | A | A | A | O |
| | Expect | R | I | I | I | M |
| | Neutral | R | I | I | I | M |
| | Tolerate | R | I | I | I | M |
| | Dislike | R | R | R | R | Q |

Kano's Evaluation Table:

| Smartphone attributes | M | O | A | Q | R | I | Total | Category of Kano's model |
|---|---|---|---|---|---|---|---|---|
| 1. | | 1 | | | | | 1 | O |
| 2. | | | | | | | | |
| 3. | | | | | | | | |
| … | | | | | | | | |

(Note: **M** = Must be; **O** = One-dimensional or performance; **A** = Attractive; **Q** = Questionable; **R** = Reverse; **I** = Indifferent)

As mentioned in the previous section, one of the major challenges of implementing Kano's method is to ensure that target respondents understand the nature of Kano's survey which includes the functional and dysfunctional parts of questionnaires. In this regard, it is important to provide a brief introduction of Kano's method to the respondents. As indicated in Ahmad (2014), the young segment of consumers is the heaviest users of mobile communication; they use smartphone for various purposes and are very familiar with its latest attributes. This segment of users is

regarded as 'lead users'; they are normally customers who are ahead of market trends and have communication needs that go far beyond those of the average users. To enhance reliability of the responses, this study ensures that first, target respondents are among the heaviest smartphone users and second, they are briefly informed about the functional and dysfunctional questions prior to the survey.

The questionnaires of this survey include the latest and general attributes of smartphone derived from product specifications of leading smartphone manufacturers and recent articles on smartphone features and convergent products, such as Song (2016), Ganesan and Sridhar (2014) and Lee et al. (2012). Our selected product attributes reflect the quality attributes commonly used in smartphone research such as in Song (2016); they include memory, battery usage time, screen size, display resolution, depth, weight, camera solution, build, sound quality, crash resistance, water resistance, voice recognition, fingerprint sensors, processing speed, wireless charger, battery charging time, multitasking, 3D function, accidental damage warranty, internet speed and call connectivity. Although internet speed used to be regarded as an online related service, and call connectivity as a basic function, they are included as 'general attributes' to reflect the current nature of smartphone as a convergent product (see Lee et al., 2012).

This survey employs the purposive sampling technique in which the author identifies three graduate students who have experienced or are familiar with Kano's questionnaires. These students serve as research assistants (RAs) for the data collection purpose and their primary task is to brief target respondents about the nature of Kano's survey particularly, on the functional and dysfunctional aspects of Kano's questionnaires prior to participation of the respondents. These RAs were requested to distribute the questionnaires to smartphone users in the university campus as well as outside the campus within the period of six weeks, from October 10th until November 21st, 2016. The reason behind the chosen sampling technique and data collection was to gather a sample of appropriate size within a time constraint and to ensure that respondents had a brief understanding of the unique nature of Kano's questionnaires before participating in the survey. Table 1 shows the profiles of the respondents in this survey. As shown in the table, about 86% of the respondents are the young segment of smartphone users. Although this survey was conducted in Japan; the respondents included both local and international students or residents from 29 countries; about 74% from Asia, and the remaining 26% included the respondents from Europe, North America and Africa.

**Table 1**
Profiles of Respondents

| Gender | | |
| --- | --- | --- |
| | **Total** | **Percentage** |
| Male | 53 | 44.92% |
| Female | 65 | 55.08% |
| **Age Group** | | |
| 20–29 | 101 | 86% |
| 30–39 | 13 | 11% |
| 40–49 | 4 | 3% |
| **Total** | 118 | 100% |
| **Region** | | |
| Asia | 87 | 73.7% |
| Europe | 11 | 9.3% |
| North America | 10 | 8.5% |
| Africa | 10 | 8.5% |
| **Total** | 118 | 100% |

## 4. FINDINGS

Table 2 shows classification results of smartphone attributes ranging from call connectivity to accidental damage warranty. Description of each smartphone attribute employed in this study is included in the appendix. As shown on the right side of Table 2, call connectivity, internet speed, memory, battery usage time, camera resolution, sound quality, crash resistance, finger print sensors, processing speed are categorized as performance or '*one-dimensional*' in Kano's method of classification. These attributes have a linear relationship with customer satisfaction in which better performance of each attribute will lead to a higher level of customer satisfaction. Display resolution, water resistance, wireless charger, battery charging time, accidental damage warranty are categorized as '*attractive*' attributes. Attractive or exciting attributes reflect the requirements that customers do not expect to be satisfied, but if they are addressed, the customers will have a high level of satisfaction, and if not satisfied, it will not cause their dissatisfaction.

**Table 2**
Classification of Smartphone Attributes Based on Kano's Method

| Smartphone Attributes | M | O | A | Q | R | I | Total | Category of Kano's model |
|---|---|---|---|---|---|---|---|---|
| 1. Call connectivity | 41 | 43 | 15 | 18 | 0 | 1 | 118 | One-dimensional |
| 2. Internet speed | 17 | 75 | 17 | 7 | 0 | 2 | 118 | One-dimensional |
| 3. Memory | 12 | 50 | 31 | 24 | 1 | 0 | 118 | One-dimensional |
| 4. Battery usage time | 12 | 49 | 33 | 20 | 0 | 4 | 118 | One-dimensional |
| 5. Screen size | 10 | 13 | 32 | 37 | 1 | 25 | 118 | Indifferent |
| 6. Display resolution | 12 | 22 | 41 | 41 | 1 | 1 | 118 | Attractive |
| 7. Depth | 1 | 3 | 8 | 63 | 0 | 43 | 118 | Indifferent |
| 8. Weight | 1 | 73 | 4 | 40 | 0 | 0 | 118 | One-dimensional |
| 9. Camera resolution | 14 | 45 | 37 | 21 | 0 | 1 | 118 | One-dimensional |
| 10. Build | 16 | 25 | 33 | 41 | 0 | 3 | 118 | Indifferent |
| 11. Sound quality | 18 | 41 | 28 | 29 | 0 | 2 | 118 | One-dimensional |
| 12. Crash resistance | 10 | 51 | 30 | 25 | 1 | 1 | 118 | One-dimensional |
| 13. Water resistance | 2 | 29 | 55 | 32 | 0 | 0 | 118 | Attractive |
| 14. Voice recognition | 4 | 27 | 19 | 66 | 1 | 1 | 118 | Indifferent |
| 15. Fingerprint sensors | 22 | 38 | 22 | 34 | 0 | 2 | 118 | One-dimensional |
| 16. Processing speed | 16 | 63 | 24 | 14 | 1 | 0 | 118 | One-dimensional |
| 17. Wireless charger | 2 | 20 | 58 | 35 | 0 | 3 | 118 | Attractive |
| 18. Battery charging time | 6 | 38 | 42 | 30 | 1 | 1 | 118 | Attractive |
| 19. Multitasking | 10 | 24 | 29 | 52 | 1 | 2 | 118 | Indifferent |
| 20. 3D function | 1 | 11 | 42 | 58 | 0 | 6 | 118 | Indifferent |
| 21. Accidental damage warranty | 13 | 31 | 45 | 28 | 0 | 1 | 118 | Attractive |

(Note: **M** = Must be; **O** = One-dimensional or performance; **A** = Attractive; **Q** = Questionable; **R** = Reverse; **I** = Indifferent)

Screen size, depth, build, voice recognition, multitasking, 3D function are categorized as '*indifferent*' attributes. This category implies that the presence or absence of those attributes does not make a real difference to the satisfaction of smartphone users included in this survey. As we expected, none of the general attributes are considered as 'must-be' attributes; this supports

Hypothesis 1, which states that consumer evaluation of the smartphone quality attributes merely reflects the three categories of Kano's classifications, i.e. *one-dimensional, attractive* and *indifferent*. The findings also reflect customer's expectation for better performance, even for an attribute that is considered as a basic function or requirement (i.e. call connectivity) in other studies such as in Lee et al. (2012). It should be noted that as the respondents in this survey include smartphone users from various countries, their evaluation of the performance of call connectivity may also be influenced by the development of network technologies in their home countries.

**Table 3**
A summary of classification results for each category

| Classification | Attributes | Number of Attributes |
|---|---|---|
| One-dimensional (performance) | Call connectivity, Internet speed, Memory, Battery usage time, Weight, Camera resolution, Sound quality, Crash resistance, Fingerprint sensors, Processing speed | 10 |
| Attractive | Display resolution, Water resistance, Wireless charger, Battery charging time, Accidental damage warranty | 5 |
| Indifferent | Screen size, Depth, Build, Voice recognition, Multitasking, 3D function | 6 |

Table 3 summarizes the findings of customer evaluation of smartphone attributes; almost half (10 out of 21 attributes, or 47.6%) of the attributes selected in this study are categorized as the *one-dimensional* or performance category, while merely five attributes are categorized as *attractive* ones. These findings do not support Hypothesis 2, which predicts that consumer evaluation of smartphone attributes will equally reflect *one-dimensional* and *attractive* attributes. A significant implication of the findings is that as *one-dimensional* or performance attributes have a linear relationship with customer satisfaction, it is critical for companies to prioritize the necessary actions or improvements on *one-dimensional* over the *attractive* attributes. Moreover, improvements of the latter attributes are not expected by smartphone users, thus will not cause customer dissatisfaction if they are not fulfilled.

Table 4 shows analysis results of customer evaluation of the impact of smartphone attributes on customer satisfaction. The customer satisfaction (CS) coefficient indicates how strongly each attribute influences customer satisfaction (or the fulfillment of quality) and dissatisfaction (or the non-fulfillment of each quality). The implication of the CS coefficient is whether satisfaction can be increased by improving the quality of product attributes or whether fulfilling this requirement of quality merely prevents the customer from being dissatisfied. This study adopted Berger et al. (1993)'s calculations of the average impact of each attribute on satisfaction and dissatisfaction. The extent of satisfaction or satisfaction index (SI) is calculated by adding the 'attractive' and 'one-dimensional' column and dividing the sum by the total of 'attractive', 'one-dimensional', 'must-be' and 'indifferent' responses, or (A+O)/(A+O+M+I). The positive CS coefficient ranges from 0 to 1; the closer the value is to 1, the higher the influence on CS; a positive CS coefficient that is close to 0 indicates merely low influence on CS. For example, internet speed and battery usage time have a high influence on customer satisfaction, 0.79 and 0.72 respectively. The results indicate that better performance of these attributes lead to a higher level of customer satisfaction.

**Table 4**
Impact of Fulfillment of Smartphone Attributes on Customer Satisfaction

| Smartphone Attributes | Total | Category of Kano's Model | Extent of Satisfaction (SI) | Extent of Dissatisfaction (DI) |
|---|---|---|---|---|
| 1. Call connectivity | 118 | One-dimensional | 0.50 | –0.72 |
| 2. Internet speed | 118 | One-dimensional | 0.79 | –0.79 |
| 3. Memory | 118 | One-dimensional | 0.69 | –0.53 |
| 4. Battery usage time | 118 | One-dimensional | 0.72 | –0.54 |
| 5. Screen size | 118 | Indifferent | 0.49 | –0.25 |
| 6. Display resolution | 118 | Attractive | 0.54 | –0.29 |
| 7. Depth | 118 | Indifferent | 0.15 | –0.05 |
| 8. Weight | 118 | One-dimensional | 0.65 | –0.63 |
| 9. Camera resolution | 118 | One-dimensional | 0.70 | –0.50 |
| 10. Build | 118 | Indifferent | 0.50 | –0.36 |
| 11. Sound quality | 118 | One-dimensional | 0.59 | –0.51 |
| 12. Crash resistance | 118 | One-dimensional | 0.70 | –0.53 |
| 13. Water resistance | 118 | Attractive | 0.71 | –0.26 |
| 14. Voice recognition | 118 | Indifferent | 0.40 | –0.27 |
| 15. Fingerprint sensors | 118 | One-dimensional | 0.52 | –0.52 |
| 16. Processing speed | 118 | One-dimensional | 0.74 | –0.68 |
| 17. Wireless charger | 118 | Attractive | 0.68 | –0.19 |
| 18. Battery charging time | 118 | Attractive | 0.69 | –0.38 |
| 19. Multitasking | 118 | Indifferent | 0.46 | –0.30 |
| 20. 3D function | 118 | Indifferent | 0.47 | –0.11 |
| 21. Accidental damage warranty | 118 | Attractive | 0.65 | –0.38 |

The extent of dissatisfaction or dissatisfaction index (DI) is calculated by adding 'must-be' and 'one-dimensional' column and divide them by the same normalizing factor, i.e. the total of 'attractive', 'one-dimensional', 'must-be' and 'indifferent' responses or $-1(M + O)/(A + O + M + I)$. Note that a minus sign is placed in front of the CS coefficient of customer dissatisfaction to emphasize its negative influence on CS when a particular attribute quality is not fulfilled. The negative CS coefficient ranges from 0 to –1; if the value is close to –1, it indicates that the influence on customer dissatisfaction is especially high if the attribute is not fulfilled. A value close to 0 signifies that the attribute does not cause dissatisfaction if it is not fulfilled. Using earlier examples of an internet speed and battery usage time, dissatisfaction results are –0.79 and –0.54 respectively; internet speed has a higher level of dissatisfaction among the users as compared with battery usage time. This implies that the users expect the companies to address or improve the performance of these attributes if their dissatisfaction levels are to be reduced. Furthermore, as one-dimensional attributes have a linear relationship with customer satisfaction, their continuous improvement is critical and requires constant inputs regarding customer requirements and expectations.

Based on the results of CS coefficient from Table 4, Figure 3 illustrates selected smartphone attributes of each category and the extent of their influence on customer satisfaction and dissatisfaction. Findings from Table 4 and Figure 3 indicate that attributes associated with

enhancing user's productivity and usage experience such as processing speed and internet speed have higher influence on customer satisfaction, SI of 0.79 and 0.74 respectively, while attributes that are associated with the latest convergent technologies such as 3D functions and multi-tasking are 0.47 and 0.46. The findings support Hypothesis 3, which presumes that *one-dimensional* or performance attributes have higher influence on customer satisfaction than the *attractive* attributes. Notably, attributes of *attractive* category such as display resolution and wireless charger also have a relatively lower impact of customer satisfaction when compared with battery usage time, internet speed and the processing speed of applications in a smartphone.

Figure 3 also illustrates that 'one-dimensional' attributes have a greater impact on customer satisfaction and dissatisfaction as compared with 'attractive' and 'indifferent' attributes; this is parallel to the general prioritization rule of thumb for the importance of attributes, i.e. Must-be > One-dimensional > Attractive > Indifferent. Thus, improvement of *one-dimensional* attributes such as internet and processing speed will not only lead to a higher level of customer satisfaction but also reduce dissatisfaction. Further enhancements of 'attractive' attributes such as a wireless charger, water resistance and display resolution will lead to a higher level of customer satisfaction than the current satisfaction level. Although these attributes are not expected by the customers, their improvements will delight the smartphone users. 'Indifferent' attributes such as depth (thickness or thinness of the device), 3D function and multi-tasking reflect a low influence on customer satisfaction and dissatisfaction, thus, should be the last to be considered for future product enhancement efforts.

Figure 3

**Selected Smartphone Attributes and the Extent of Their Impact on Customer Satisfaction and Dissatisfaction**
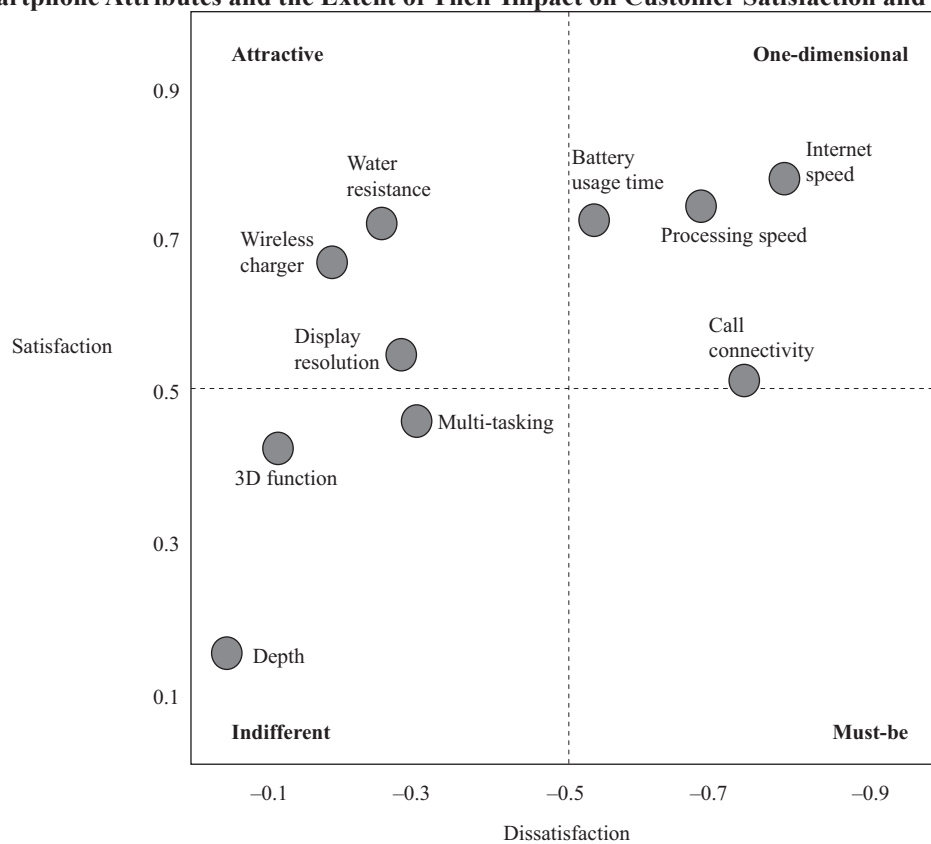


Kano's model holds that 'one-dimensional' attributes have a significant impact on customer dissatisfaction. Thus, improvement of these attributes should be prioritized to minimize customer dissatisfaction. The results indicate that attributes associated with productivity and usage experience are critical to increase customer satisfaction and decrease dissatisfaction. Different

consumer segments of smartphone tend to have different product or service requirements and expectations. Note that, in this survey, the majority of the respondents are among the heaviest product users, aged 20–29. As smartphone is characterized as a convergent product, many users use the device beyond personal and social communication needs; they heavily depend on smartphone for work or study-related activities. Interestingly, the result indicates that smartphone depth has the lowest impact on customer satisfaction and dissatisfaction; this reflects indifferent users' feeling toward the attribute. In a saturated smartphone market, distinctive product features or points of difference (POD) of the 'hardware' such as premium design or thickness or thinness of the device among the competing brands are of relatively low importance. Thus, customers tend to expect attributes that are associated with product performance that enhance user's productivity and usage experience such as processing speed of its applications and internet speed.

## 5. CONCLUSIONS

Continuous developments of smartphone attributes are to be expected as the product is highly influenced by technological advancements and increasing usage among the customers. As smartphone users heavily depend on the product for multi-purpose communication activities, it is critical to examine the impact of each new attribute on customer satisfaction. The analysis of this study reaffirms that development efforts of product attributes should be directed at not only what a product (technology) can do but also on the attributes that matter to customers. This study employs Kano's method in classifying various smartphone attributes into *'one-dimensional'*, *'attractive'*, and *'indifferent'* category and examines the impact of those attributes on customer satisfaction. These classifications are useful to prioritize attributes that matter most to customers, and are particularly crucial for a technology-oriented product such as smartphone in which boundless new product attributes are developed. A significant implication of the analysis is that a deeper understanding of the link between existing smartphone attributes and customer satisfaction may lead to better product improvement efforts, and possibly anticipate future attributes that are highly expected by customers.

The findings of this study indicate various levels of satisfaction and dissatisfaction with the general and latest smartphone attributes in the perception of customers. Further product improvement activities follow the general prioritization rule, i.e. 'Must-be > One-dimensional > Attractive > Indifferent'; our findings provide not only better understanding of customer requirements and satisfaction but also insights on specific smartphone attributes that matter most to customers. To strengthen competitive position and ensure high customer satisfaction (and minimize dissatisfaction), development activities can be directed at improving call connectivity, internet speed, memory, battery usage time, weight camera resolution, sound quality, crash resistance, fingerprint sensors and processing speed. To gain competitive advantage through differentiation strategies, further enhancement efforts are to be channeled at 'attractive' attributes such as display resolution, water resistance, wireless charger, battery charging time and accidental damage warranty. Further investment and improvement of smartphone attributes such as screen size, depth, build, voice recognition, multitasking, and 3D function are to be carefully considered as the results indicate that their presence or absence does not make a real difference to customer satisfaction.

Kano's model is an instrumental and a dynamic tool for efforts to develop new products and to examine customer satisfaction with its exiting attributes at various stages of the product life cycle. It should be noted that Kano's model is inherently customer-driven, i.e. focuses exclusively on addressing concerns of customers (see Sireli et al., 2007). As such, from the product development perspective, it disregards the main concern of companies in terms of their capabilities and/or cost constraints to meet customer requirements. It is worth mentioning that to some extent, the quality

of the questionnaires, interviewer(s) and target respondents is more crucial for the reliability and validity of research based on Kano's method as compared with other consumer surveys. Thus, a rewarding application of Kano's method requires a thoughtful design of the questionnaires, clarity of the functional and dysfunctional questions and respondents' familiarity with Kano's method. These are the main challenges in conducting a survey based on the method; this study made utmost efforts in dealing with the challenges in order to enhance the effectiveness of our survey. Finally, as the importance of smartphone attributes differs in various contexts and across segments, generalization of the findings should consider the followings: first, the respondents of this survey include mainly young and heavy users of smartphone and second, although the survey was conducted in Japan, the respondents included smartphone users from 29 different countries. Future research should include a larger sample size across segments and/or in a specific market(s) and consider a questionnaire design that focuses on customer benefits instead of product attributes.

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## APPENDIX 1: DESCRIPTION OF SMARTPHONE ATTRIBUTES

| No. | Attribute | Description |
|---|---|---|
| 1 | Call connectivity | The degree of call connections without fail |
| 2 | Internet speed | Network data speed via a smartphone |
| 3 | Memory | Internal storage capacity for pictures, videos, and applications |
| 4 | Battery usage time | Battery lifetime after a full charge |
| 5 | Screen size | The size of smartphone screen |
| 6 | Display resolution | The resolution of the smartphone screen; the higher the resolution, the better the definition |
| 7 | Depth | Thickness or thinness |
| 8 | Weight | Heaviness |
| 9 | Camera resolution | The definition of the built-in camera (megapixels) |
| 10 | Build | Build quality with aluminum unibody design (premium looking) |
| 11 | Sound quality | Sound quality of voices, audios, or videos |
| 12 | Crash resistance | The degree of crash or drop resistance |
| 13 | Water resistance | he degree of water resistance |
| 14 | Voice recognition | A human interface which enables users to perform tasks by voice commands |
| 15 | Fingerprint sensors | Touch-based responsive finger print sensors |
| 16 | Processing speed | The processing speed of applications in a smartphone |
| 17 | Wireless charger | Built-in wireless charging capabilities |
| 18 | Battery charging time | Quick charging time after the battery is dead to a reasonable state (more than 50% in less than an hour) |
| 19 | Multitasking | Using multiple functions such as running applications, text messaging, and web surfing, simultaneously |
| 20 | 3D function | A function that enables users to watch a 3D movie, or play a 3D game |
| 21 | Accidental damage warranty | Damage warranty during the first year |

# Impact of Social, Epistemic and Conditional Values on Customer Satisfaction and Loyalty in Automobile Industry: A Structural Equation Modelling

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## ABSTRACT

The purpose of this study is to identify the social, epistemic and conditional values associated with automobiles and to examine their impact on customer satisfaction and brand loyalty. A sample size of 198 respondents was chosen from various locations near Jeddah in Saudi Arabia using convenient sampling techniques. A multi-factor customer perceived value questionnaire with a Likert scale from 1 to 5 was used to collect the data to determine the social, epistemic and conditional perceived values associated with automobiles and their impact on customer satisfaction and brand loyalty. AMOS was used to generate the result and to analyse the collected data. 5 items were reduced from the original construct to meet the standard loading during the confirmatory factor analysis. Then structural modelling was conducted on a full model and satisfaction as a mediator model. The findings were that epistemic value and conditional value have a positive and significant impact on satisfaction. Also epistemic value and satisfaction have a positive and significant impact on loyalty. However, social value has a negative impact on satisfaction and loyalty in the full model and the mediator model as well. Therefore, epistemic value and conditional value are important dimensions or values associated with automobile brands in Saudi Arabia and they affect customer satisfactions and loyalty.

## 1. INTRODUCTION

Customer perceived value (CPV) is a popular topic in marketing and is used by many researchers around the world (Zauner, Koller and Hatak, 2015). Recently, much research has been done on developed and developing countries. A body of research has been done on USA, UK, Spain, Italy, Portugal, Norway and France, representing developed countries, and on Pakistan, UAE, Korea, South Korea, China, Indonesia, Malaysia, Taiwan and Saudi Arabia, representing developing countries (Desmet, 2014). Similarly, much research on CPV associated with products and services from various industries such as IT, food, retail, tourism, airline, online, banking and

automobile industries was done previously. CPV related studies carried out among the Middle East countries seem to pay very little attention to Saudi Arabia in particular (Chang and Tseng, 2013) except the study done by Moosa and Hassan (2015). CPV was measured in terms of quality, price, design, privacy and satisfaction by many researchers and these measures were found to be the most commonly cited variables in the past. Research shows that there was a positive impact of CPV on retention, satisfaction and customer repeat purchase (Yang and Jolly, 2009). Most of the research shows that CPV has a positive impact on brand loyalty. Also, CPV has a positive impact on retention, satisfaction and repeat purchase (Yang and Jolly, 2009; Vera and Trujillo, 2013; Wu, Chen, Chen and Cheng, 2014).

There are many elements of CPV which impact positively brand loyalty such as price, which is considered the most powerful factor in customer retention for an organisation. Price is an important factor which influences customer decision-making for a product or service. Customers are willing to purchase a new product or service and take purchasing decisions faster when there is a reduction in price (Wu at al., 2014). If the price of a product is not appropriate, then customers might switch to another organisation because they get value for their money (Wu at al., 2014). Emotional value is also considered one of the factors which have high impact on CPV. When it comes to the decision-making, it is important to satisfy consumers psychologically, because emotions play an important role in terms of consumer purchase decision for a product or service (Xiucheng and Yunlai, 2006). Customers emotionally satisfied with a service or product are likely to repeat their purchase. One of the major variables to measure customer perceived value is functional value which meets consumers' requirements for product functions and quality (Peng and Liang, 2013). As some of the authors argued, switching cost is an important variable which has a significant impact on customer loyalty through CPV and satisfaction (Parasuraman and Grewal, 2000). Most research shows that quality has a positive impact on CPV, whereby the customer becomes more loyal toward the organisation. Some research in the past established an association between purchase intension and CPV (Calabuig, Núñez-Pomar, Prado-Gascó and Ano, 2014; Yusof, Singh and Razak, 2013). If the requirements of customers are not fulfilled, there are many negative impacts such as risk of having bad word of mouth from customers, and the image of an organisation will be affected negatively (Loureiro et al., 2012). Oliver and Swan (1989) pointed out that customer loyalty is an important factor which can play an important role in increasing revenue of an organisation.

This paper is organised as follows: the first part is research background and research rationale. The second part is the theoretical framework and research hypothesis development. The third part discusses the research design and methodology, data collection procedures and process. The fourth part presents the results and discussion. The final part is conclusion and recommendations, and implications for further research.

## 2. LITERATURE REVIEW

The most commonly cited definition of CPV proposed by Ziethmal (1988) is overall economic benefits of a product effectiveness. Another definition from the uni-dimensional perspective argued that CPV is overall assessment of the utility of a product in terms of what is obtained and what is paid (Ulaga and Chacour, 2001). One of the most frequently cited multi-dimensional definitions of CPV is proposed by Sheth, Newman and Gross (1991), who argued that CPV is about computation of values that needs to explain why a consumer chooses to buy or not to buy a particular product.

Examining the available literature regarding CPV associated with automobiles around the world, it appears that very little or only a handful of research has been done such as Hur, Kim and Park (2013), Tu, Lin and Hsu (2013), Jalilvand and Samiei (2012), Haq (2012), Leelakulthanit

and Hongcharu (2012), Yee and San (2011), Yusuf et al. (2013) and Moosa and Hassan (2015). The CPV elements covered in these studies are summarised in Table 1.

**Table 1**
Elements of CPV associated with automobiles

| Source | Customer perceived value variables |
|---|---|
| Yee and San (2011) | Perceived quality, perceived value, perceived risk, purchasing decision |
| Leelakulthanit and Hongcharu (2012) | Economic value, functional values, well-being value, nature lover value, self-efficiency value, self-expressive value |
| Jalilvand and Samiei (2012). | Word of mouth, brand image |
| Haq (2012) | Perceived quality, perceived value, customer trust, loyalty, satisfaction |
| Hur, Kim and Park (2013) | Functional value, emotional value, social value, price consciousness |
| Tu, Lin and Hsu (2013) | Corporate brand image, customer commitment |
| Yusuf et al. (2013) | Responsibility feeling, environmental values, environmental knowledge, environmental advertisement, environmental friendly product, purchasing intension |
| Moosa and Hassan(2015) | Functional values, social values, emotional values, epistemic values, conditional values, loyalty and customer satisfaction |

**Table 2**
CPV studies done on Saudi Arabia

| Source | Industry | Customer perceived value variables |
|---|---|---|
| Eid (2011) | Commerce (Online) | Quality, privacy, satisfaction, perceived security |
| Abu Bakar, Al Ruwais and Othman (2013) | Retail/shopping mall | Physical aspects, reliability, professionalism, helpful, problem solving, and policy |
| Abu Bakar (2014) | Retail | Design, privacy |
| Alsheikh and Bojei (2014) | Mobile banking | Mobile phone experience, awareness of service, performance expectancy, effort expectancy, perceived cost, perceived risk |
| Moosa and Hassan (2015) | Automobiles | Functional, social, emotional, epistemic, and conditional values |

The studies done to examine the CPV associated with automobiles in Saudi Arabia or Middle East are far fewer or it seems that no research has been done except Moosa and Hassan (2015), who carried out the research on examining the impact of CPV using Seth et al.'s (1991) consumption value framework from multidimensional perspective in Saudi Arabia.

The study done by Moosa and Hassan(2015) used customer satisfaction as a mediator between CPV and loyalty, although it used regression values generated to establish the relationship between CPV and brand loyalty using satisfaction as a mediator. The method used to analyse the mediator factor seems not appropriate or accepted by many scholars in the relevant field. Therefore, it is important to review more relevant research before proceeding to conclude with a conceptual framework and analysis. This study discussed the key limitations of Moosa and Hassan (2015) and the reason for using Structural Equation Modelling to establish the original path diagram or conceptual framework used by Moosa and Hassan (2015). The study done by Bakon and Hassan (2013) was considered as the first empirical research conducted using the five consumption values originally established by Seth et al. (1991). For this reason, this study adopted the three key elements of the same theoretical framework: the three CPVs of social (SV), epistemic (EPV) and conditional values (CV), where the first two values were found insignificant

in influencing both satisfaction and loyalty (Moosa and Hassan, 2015). Therefore, in this study only social and epistemic values are considered as there were various studies done elsewhere that found that these two values have a significant influence on customer satisfaction and loyalty. The third value of conditional value is also considered as in Saudi Arabia, only men are allowed to drive automobiles, which may have some influence on the level of loyalty or satisfaction. Each multi-dimensional value in relation with customer satisfaction and loyalty is reviewed below.

## 2.1. Social Value and Customer Satisfaction

Social value has a direct relation with social status. This dimension has a wide concept which includes social capital and citizens' well-being as well. This can be the ability to take part in decision making that affects them. Perceived social values have a significant positive effect on customer satisfaction with respect to green innovation as a key attribute of the automobile (Hur et al., 2013). Further, customer satisfaction leads to customer loyalty, while lowering price consciousness. Researchers tend to relate social values as social interactions, sociability and hospitality (Payne and Holt, 2001). Personality and own self-image were evaluated during the process of decision making as it is believed that both personality and self-image alignment creates more acceptance in the society (Chon, 1992; Tabassum, Zafar, Ali, Alam and Ali, 2013). Celebrity status associated with a particular product attracts many people's attention (Lee et al., 2008). Buying socially recommended products through media or friends is a usual practice to obtain satisfaction (Miguens et al., 2008). Popular or socially more accepted automobiles create a better image and greater acceptance among people (Mahika, 2011; Tabassum et al., 2013). Social relationships are a motivating factor for many people to create satisfaction and loyalty (Vuuren and Slabbert, 2011). Meanwhile, Sheth et al. (1991) argued that social value is the acceptability of consumers' relationship with the social environment. Social values are considered to be the most important multi-dimensional variables which influence consumers and their purchasing intentions, which has a direct impact on customer satisfaction. In the past, a handful of research was done to explore the impact of these variables on brand loyalty, especially among automobile manufacturers (Eid, 2011; Abu Bakar, 2013; Alsheikh and Bojei, 2014). However, Moosa and Hassan (2015) found that social values do not have any significant impact on customer satisfaction and loyalty. Since the past research brought mixed results, it is important to consider this value and test it to examine whether social values have a positive and significant impact on customer satisfaction and loyalty.

## 2.2. Epistemic Value and Customer Satisfaction

Sheth et al. (1991) defined epistemic value as "*capacity of the product or service to satisfy the desire for knowledge*". Epistemic value refers to novelty value as well as value gained from learning a new way of doings things such as experience or knowledge gained through testing or exploring new services. Epistemic values can influence the customer intension, which has a direct impact on customer satisfaction and loyalty (Cheng et al., 2009). Similarly, Chang et al. (2013) found that epistemic values have a positive influence on customer satisfaction and loyalty. In their study, epistemic value associated with e-store is translated to utilitarian and hedonic values where perceived value and utilitarian value exert a bigger influence than hedonic value resulting in more brand loyalty. In terms of measuring CPV associated with automobiles, variables such as epistemic values seem quite applicable to measure CPV of a car (Ehsani and Hashim 2015). However, recent studies have found that epistemic value does not have a significant influence on customer satisfaction and loyalty in the automobile industry (Moosa and Hassan, 2015).

## 2.3. Conditional Value and Customer Satisfaction

Conditional value is perceived benefit gained in a particular situation. It reflects the circumstance in which some market choices are dependent on the particular situation faced by the consumers of a product or service (Sheth et al., 1991). Meanwhile, Ehsani and Hashim (2015) argued that conditional values are appropriate to measure CPV of a customer perceived value associated with automobiles. Conditional values arise when a need is fulfilled using a specific service or product. Sweeney and Soutar (2001) explained conditional value as a specific case of other types of value. Moosa and Hassan (2015) empirically found that conditional values associated with automobiles are significant and positive in influencing customer satisfaction and loyalty.

Therefore, the following hypotheses are formulated:
H1: There is positive and significant influence of SV on customer satisfaction
H2: There is a positive and significant impact of EPV on customer satisfaction
H3: There is a positive and significant influence of CV on customer satisfaction
H4: There is a positive and significant influence of SV on brand loyalty
H5: There is a positive and significant influence of EPV on brand loyalty
H6: There is a positive and significant influence of CV on brand loyalty
H7: There is a positive and significant influence of SAT on brand loyalty
H8: Satisfaction is a partial mediator between EPV and brand loyalty

**Figure 1**
Conceptual framework
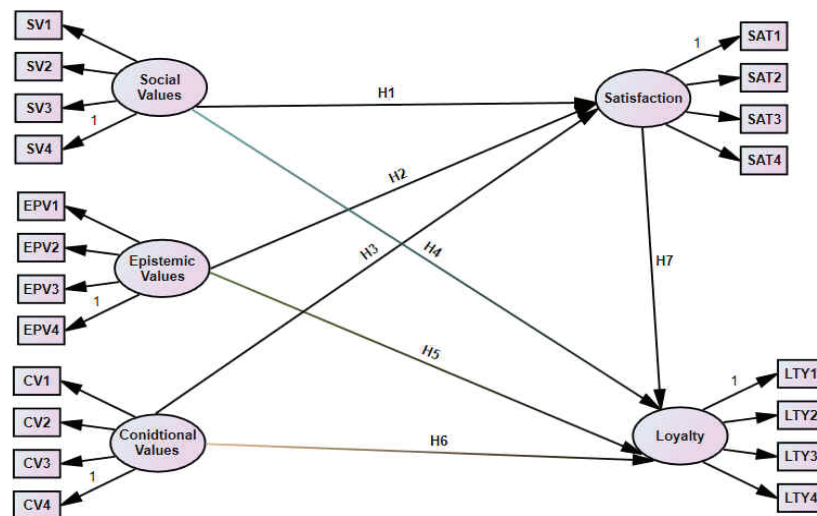


Source: Adapted from Moosa and Hassan (2015)

## 3. RESEARCH DESIGN AND METHODOLOGY

### 3.1. Research Paradigm and Design

The researcher decided to use the positivist paradigm since this research intends to measure causal influences of CPV (independent factor) on customer satisfaction (mediator) and brand loyalty (dependent factor). The casual research design is mainly adopted since this research focuses on testing hypotheses, using a large sample size to generalise the findings (Hair et al., 2009). The research used primary data collected using a rating scale questionnaire (1–5 scale).

### 3.2. Questionnaire

The questionnaire is designed to gather the data. It consists of three parts. Part 1 deals with personal details such as sex, education, age, etc. Part 2 consists of 12 statements to measure the 3 dimensions of customer perceived value (CPV) such as social value (SV), epistemic value (EPV), and conditional values (CV). Part 3 consists of 8 statements which are divided into two main variables. Four (4) statements were used to measure customer satisfaction and four (4) statements to measure customer brand loyalty. To generate these final 20 items, the following procedures were followed. At first, a total of 12 experts (academicians, marketing and sales managers, and car owners residing in Jeddah) were asked to:

✓    Write actual statements that represented the values and items;
✓    Clarify the definitions of each value items when it was necessary;
✓    Add additional items to the existing value dimensions if it was deemed constructive.

As a result of these procedures, an initial pool of 35 items (representing 7 sub-dimensions) was generated. These items were then incorporated as statements into a measurement instrument utilising a five-point Likert-type scale (1 "strongly disagree" to 5 "strongly agree") (Dolnicar, Grun, Leisch and Rossiter, 2011). A panel of four (4) experts in the automobile industry assessed content validity by assessing items on the basis of their relevance and clarity of wording. Items that were endorsed by four (4) experts were retained, whereas items that were deemed to be unclear, irrelevant, or redundant were eliminated. As a result of these procedures, 10 items were eliminated. The remaining 25 items were included in a questionnaire for a pilot field test. The pilot test involved 30 car owners driving the car from their homes to the workplace in Jeddah, Saudi Arabia. The respondents were asked to rate the items to examine the relevance and validity of each item. As a result of this test, none of the items was deleted as these items were found non-ambiguous and reliable.

### 3.3. Sampling Method

A convenience sample of 250 car owners or drivers was recruited to assess internal consistency. Five (5) further items that had been corrected based on factor loading using AMOS, which has a loading less than 0.4, were deleted. After these items had been deleted, Cronbach's alpha coefficients for all factors were greater than 0.70. Following these scale-purification procedures, the final version of the instrument had a total of 20 items representing 5 sub-dimensions of customer perceived value along with customer satisfaction and brand loyalty (with each sub-dimension having four items). A total of 211 questionnaires were received (response rate 84%). However, some of these questionnaires were excluded from the sample as some respondents did not complete the questionnaire. This means that the study only used 198 completed questionnaires (sample size).

### 3.4. Ethical Consideration

Prior to the collection of data, respondents were requested to complete the consent form which was attached to the questionnaire to obtain the permission from each respondent. Participant Information Sheet (PIS) was given to respondents to inform them of the purpose and the importance of this research. The completed questionnaires were collected by the researchers and reminded the respondents to inform the researcher if they wished to withdraw from this study before the data were processed (7 days).

### 3.5. Data Analysis

Data were analysed using SPSS 21.0 (Field, 2005) and AMOS 22. The goodness of fit of the measurement and structural models was tested using AMOS with the maximum likelihood (ML) method. Goodness of fit of the model to the data was assessed with the comparative fit index (CFI), root mean square error of approximation (RMSEA), and $X^2/df$ and normed chi-square (Anderson and Gerbing, 1988). The convergent validity of the measures was assessed by factor loadings, AVE values, and reliability coefficients (Hair et al., 2009). Discriminant validity was established when the estimated correlations between the factors or dimensions were found not to be excessively high (Kline, 1998) and when the squared correlations between a construct and any others were found to be less than the AVE for each construct (Fornell and Larcker, 1981).

## 4. RESULTS AND DISCUSSION

### 4.1. Descriptive Statistical Analysis

Descriptive statistics for the 5 dimensions ranged (on a scale of 1–5) from 3.48 (Social Values – SV) to 4.08 (Satisfaction). The standard deviation (SD) ranged from 0.96 to 1.48. Because ML statistics are very sensitive to non-normality (Bentler, 2004), the skewness and kurtosis were examined to ensure that dataset is acceptable in terms of normality. Since many scholars argue if kurtosis and skewness fall between -1 to 1 or if skewness (SK/SE is equal to or less than 2), the dataset can be acceptable for a multivariate analysis. Since the dataset meets the required set of rules, the dataset is considered as normally distributed. All the skewness of the dataset is less than 2.

### 4.2. First Order Analysis

CFA (measurement model) of CPV and Brand Loyalty

To assess the measurement model, two analyses were carried out. First, a first-order CFA was carried out to analyse the measurement model using AMOS 22. The main reason for conducting this analysis is to confirm the latent variables really reflect the intended measures in the instrument. Second, the squared correlation was examined to measure each indicator and to examine whether each item measures a construct (Holmes-Smith, 2001; Hair et al., 2009). The first analysis shows that most of the items in the construct loaded more than 0.5, which shows a good reliability of the model. The first run of squared multiple correlation showed that the majority of the model is suitable and appropriate (Holmes-Smith, 2001).

To test the reliability of the CPV and its influence on customer satisfaction and brand loyalty instruments, the Cronbach's alpha coefficient was calculated using SPSS 22. Table 1 below shows that Cronbach's alpha exceeds the minimum requirement of 0.70. (Nunnally and Bernstein, 1994). It shows that there is good internal consistency among the variables or elements. The coefficients obtained range from 0.704 to 0.824 (Table 1). The estimates of the standard factor loading were used to determine the validity of CPV dimensions (as shown in Figure 2). The factor loadings in the confirmatory factor analysis ranged from 0.30 to 0.79 for the CPV dimensions. Those which are less than 0.5 are removed from the latent variables since the general rule is to maintain those items that load more than 0.7 (preferred) (Hair et al., 2009) but can include the values that loaded close to 0.5 since the AMOS22 requires minimum four items per construct.

**Figure 2**
First measurement model of latent variables
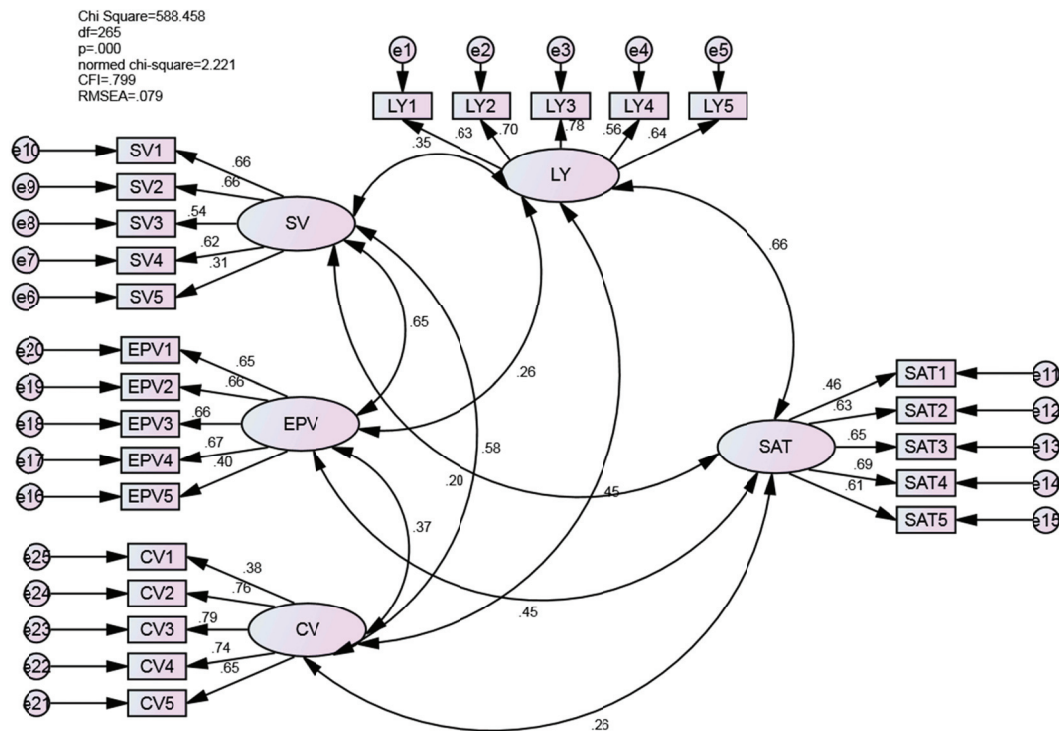


A re-run of CFA carried out, the measurement model result showed that the model was a good fit. Since each construct should have minimum 3 elements (Hair et al., 2009), modification was made using modification indices to ensure that each construct has more than 3 elements as the AMOS 22 requires minimum 4 variables/elements in each construct to successfully run (Figure 2). Table 1 below shows that each element under each construct satisfies the model.

The overall model fit of the measurement model was found to be good. Fit statistics showed that the normed chi-square ratio was below the suggested threshold of 3.0 (Kline, 1998). The RMSEA value of 0.061 was below the recommended threshold of 0.08 (Hu and Bentler, 1999). The CFI of 0.906 was, as recommended, greater than the threshold of 0.9 (Hair et al., 2009). Also the divergent validity of the model was established and justified to ensure model fit shown in Table 3. This means that all the 20 elements used to measure CPV, SAT and LY are acceptable.

**Table 3**
Divergent validity of measurement model

|  | SV | EPV | CV | SAT | LY |
|---|---|---|---|---|---|
| SV4 | .645 |  |  |  |  |
| SV3 | .467 |  |  |  |  |
| SV2 | .714 |  |  |  |  |
| SV1 | .611 |  |  |  |  |
| EPV4 |  | .668 |  |  |  |
| EPV3 |  | .673 |  |  |  |
| EPV2 |  | .682 |  |  |  |
| EPV1 |  | .627 |  |  |  |
| CV5 |  |  | .644 |  |  |
| CV4 |  |  | .743 |  |  |
| CV3 |  |  | .809 |  |  |
| CV2 |  |  | .751 |  |  |
| SAT2 |  |  |  | .617 |  |
| SAT3 |  |  |  | .644 |  |
| SAT4 |  |  |  | .663 |  |
| SAT5 |  |  |  | .627 |  |
| LY1 |  |  |  |  | .704 |
| LY2 |  |  |  |  | .757 |
| LY3 |  |  |  |  | .587 |
| LY4 |  |  |  |  | .633 |
| Construct reliability | .705 | .758 | .824 | .739 | .764 |

The dataset satisfies the discriminant validity of the sample as all the cross loading is more than 0.5.

## 4.3. Structural Equation Modelling

A structure model of CPV associated with automobiles and its effects on satisfaction and loyalty in Saudi Arabia was built to estimate the parameters. In this model, there were five models from the first-order and second-order construct. The objective of structural equation modelling (SEM) was to test if CPV affects customer satisfaction and loyalty. The causal structure model of antecedent customer satisfaction and loyalty shown in Figure 3 was designed to test the hypothesis that customer satisfaction and loyalty were influenced by perceived CPV associated with automobiles among the Saudi Arabian drivers.

**Table 4**
Discriminant validity

|  | SV | EPV | CV | SAT | LY |
|---|---|---|---|---|---|
| SV | 1 | .38 | .36 | .01 | .10 |
| EPV | .62*** | 1 | .12 | .21 | .10 |
| CV | .60*** | .35*** | 1 | .06 | .21 |
| SAT | .12 | .46*** | .25** | 1 | .41 |
| LY | .32** | .23* | .46*** | .64*** | 1 |

Significance level: *=0.05, **=0.01, ***=0.001. The values below the diagonal are correlation estimates among constructs. Diagonal elements are construct variance and the values above the diagonal are squared correlations.

There are many ways in which validity of the structural model can be examined One of the ways is indices such as chi-square, normed chi-square, CFI, RMSEA (Hair et al., 2009). Figure 4 shown below indicates that chi-square is significant with p=0.000 (chi-square is 271.434, df=159). Normed chi-square of less than 3 is considered good fit (Hair et al., 2009). CFI should be more than 0.9. The structural model with modification indices (e7 to e26) indicates that it has a value of more than 0.910, suggesting a good fit. According to Hair et al. (2009), RMSEA should be less than 0.08. In this case, RMSEA is 0.060, which is considered as a good fit.

The second way of measuring the validity of the SEM is factor loadings obtained from the measurement model and the full-fledged model that should be very close (Hair et al., 2009). In this case, Table 5 suggests that loadings of the measurement model and structural model are very similar and close to each other. This indicates that the model is validated as a good fit model. The third way of measuring the validity of the structural model is path analysis and its significance. Table 6 shows that in both models the relationships are significant except for SV not significantly associated with SAT (satisfaction). Also SV is negatively associated with satisfaction, indicating that there are some minor issues, but it does not deter the good fit of the construct or model since other path estimates are significant.

**Figure 3**
Second run and modified measurement model
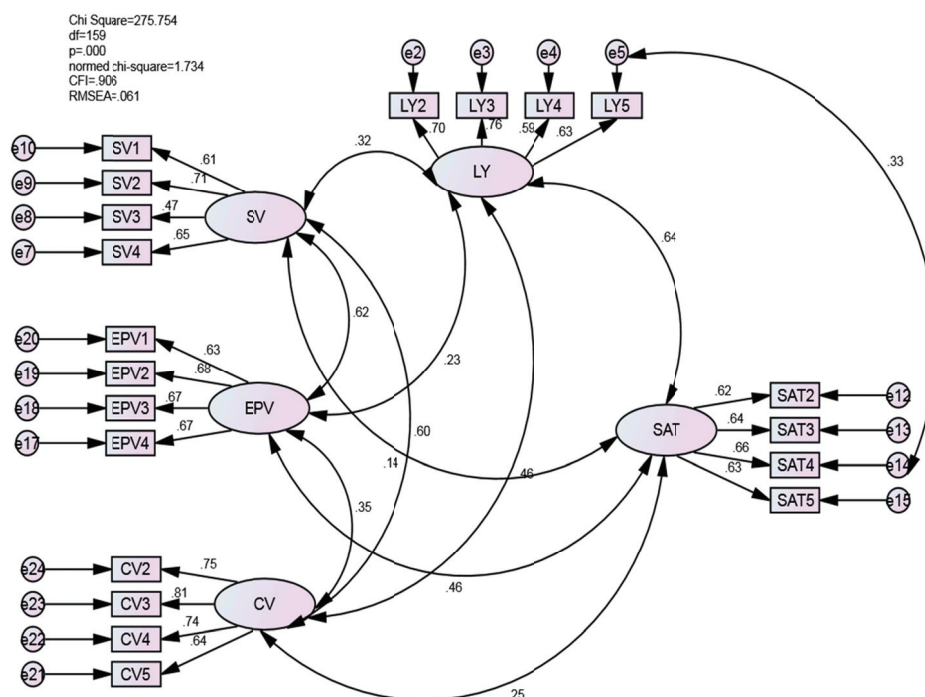
**Figure 4**
SEM for hypotheses testing
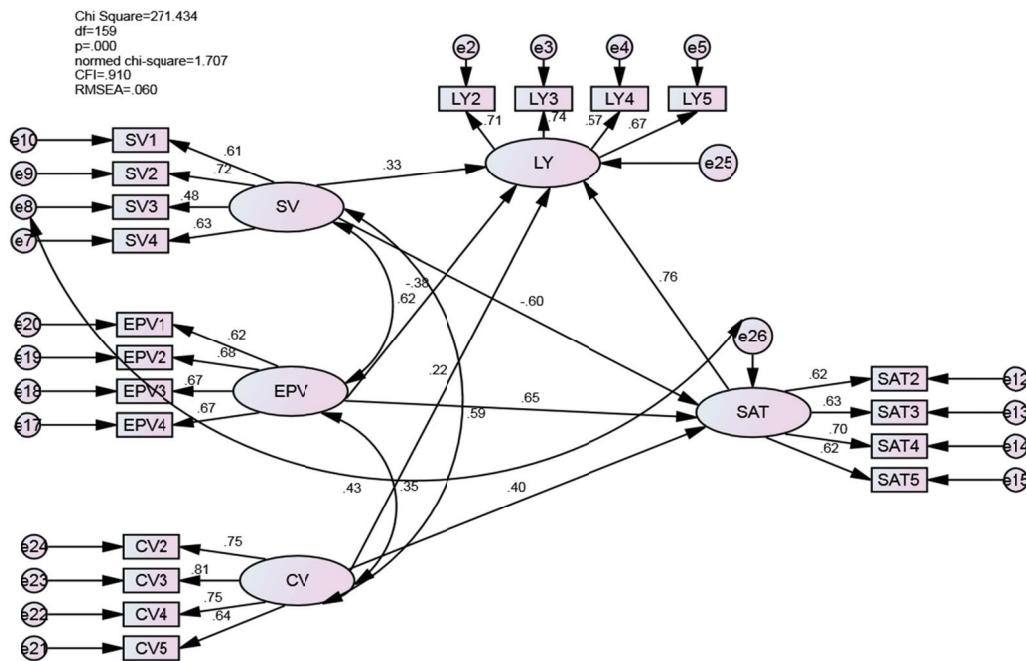


**Table 5**
Factor loading comparison

| Indicator | Construct | Measurement model | Structural model |
|---|---|---|---|
| SV4 | SV | .645 | .636 |
| SV3 | SV | .467 | .462 |
| SV2 | SV | .714 | .717 |
| SV1 | SV | .611 | .617 |
| EPV4 | EPV | .668 | .665 |
| EPV3 | EPV | .673 | .672 |
| EPV2 | EPV | .682 | .680 |
| EPV1 | EPV | .627 | .619 |
| CV5 | CV | .644 | .637 |
| CV4 | CV | .743 | .737 |
| CV3 | CV | .809 | .823 |
| CV2 | CV | .751 | .748 |
| SAT2 | SAT | .617 | .626 |
| SAT3 | SAT | .644 | .628 |
| SAT4 | SAT | .663 | .677 |
| SAT5 | SAT | .627 | .630 |
| LY1 | LY | .704 | .697 |
| LY2 | LY | .757 | .731 |
| LY3 | LY | .587 | .559 |
| LY4 | LY | .633 | .654 |

The overall model indicated that each dimension of the perception of CPV had a positive relationship with customer satisfaction and loyalty. It means that the CPV model is an acceptable and useful instrument to measure CPV dimensions in Saudi Arabia's automobile industry (foreign brands).

The CPV dimension was found to contribute to customer satisfaction and loyalty, and may be a critical aspect for customers in judging the CPV and satisfaction along with loyalty. The standardised parameter estimates and significant values for the hypothesis relationships are presented in Table 6. The findings suggest that the standard structural model of CPV associated with automobiles in Saudi Arabia is a good determinant of satisfaction and loyalty. The standardised regression weight of SV, EPV and CV to customer satisfaction was significant with parameter estimates (-0.60, 0.65 and 0.40). These regression weights explain the degree of association between the construct and the manifesting variables. In other words, if EPV increased by 1 standard deviation, the standard deviation of customer satisfaction would have increased by 0.65. Furthermore, the significant path coefficient showed that the CV dimension had a positive impact on satisfaction. However, SV had a significant but negative influence on customer satisfaction, which was similar to some past studies done in other parts of the world as well.

**Table 6**
Path analysis comparison

| Measurement model | | Structural model | |
|---|---|---|---|
| Relationship | Parameter estimates | Relationship | Parameter estimates |
| CV correlates with SAT | .25 | H1: CV → SAT | .40 |
| EPV correlates with SAT | .46 | H2: EPV → SAT | .65 |
| SV does not correlate with SAT | .12 | H3: SV → SAT | -.60 |
| CV correlates with LY | .46 | H4: CV → LY | .22 |
| EPV correlates with LY | .23 | H5: EPV → LY | -.39 |
| SV correlates with LY | .32 | H6: SV → LY | .33 |
| SAT correlates with LY | .64 | H7: SAT → LY | .76 |
| SV correlates with EPV | .35 | SV correlates with EPV | .34 |
| C correlates with SV | .60 | C correlates with SV | .60 |
| SV correlates with EPV | .62 | SV correlates with EPV | .43 |

Since EPV is the only variable that has a positive and significant impact on customer satisfaction and loyalty, the other two Hypotheses were rejected (CV has a positive impact on loyalty, SV has a significant and positive impact on loyalty) as shown in Table 7. To analyse further whether SAT is a mediator between EPV and loyalty, a mediator analysis was performed.

**Table 7**
Hypotheses

|  | Hypotheses |  | Estimate | S.E. | C.R. | P | Accepted or rejected |
|---|---|---|---|---|---|---|---|
| SAT | <--- | SV | -.599 | .135 | -2.927 | .003 | Rejected |
| SAT | <--- | EPV | .651 | .133 | 3.920 | *** | Accepted |
| SAT | <--- | CV | .403 | .096 | 2.907 | .004 | Accepted |
| LY | <--- | SAT | .764 | .167 | 5.002 | *** | Accepted |
| LY | <--- | SV | .329 | .129 | 1.837 | .066 | Rejected |
| LY | <--- | EPV | -.385 | .141 | -2.378 | .017 | Accepted |
| LY | <--- | CV | .218 | .094 | 1.764 | .078 | Rejected |

Figure 6 shows the mediator effect using constrained model.

**Figure 6**
Mediator analysis using SAT
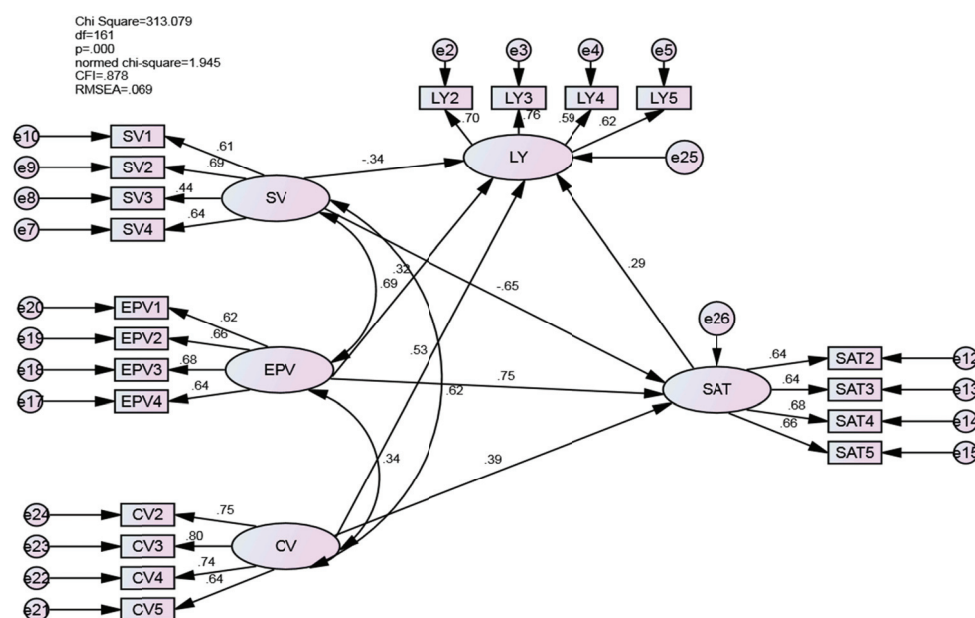


**Table 8**
Mediator analysis =Satisfaction

|  |  |  | Estimate | S.E. | C.R. | P | Label |
|---|---|---|---|---|---|---|---|
| SAT | <--- | SV | -.245 | .125 | -1.961 | .050 |  |
| SAT | <--- | EPV | .444 | .128 | 3.477 | *** |  |
| SAT | <--- | CV | .190 | .093 | 2.051 | .040 |  |
| LY | <--- | SAT | .575 | .112 | 5.122 | *** | b |
| LY | <--- | SV | .004 | .073 | .048 | .962 |  |
| LY | <--- | EPV | .000 |  |  |  |  |
| LY | <--- | CV | .247 | .082 | 3.011 | .003 |  |

**Table 9**
SAT as complete mediator between loyalty and CPV dimensions

|  |  |  | Estimate | S.E. | C.R. | P | Label |
|---|---|---|---|---|---|---|---|
| SAT | <--- | SV | -.348 | .129 | -2.701 | .007 | |
| SAT | <--- | EPV | .474 | .128 | 3.697 | *** | |
| SAT | <--- | CV | .317 | .095 | 3.351 | *** | |
| LY | <--- | SAT | .718 | .133 | 5.406 | *** | |
| LY2 | <--- | LY | 1.218 | .159 | 7.654 | *** | |
| LY3 | <--- | LY | 1.244 | .157 | 7.939 | *** | |
| LY4 | <--- | LY | 1.062 | .162 | 6.563 | *** | |

The above mediator analysis in Figure 6 shows that the model is a good fit since all the benchmark values are achieved except CFI, which is 0.878. Since the value is very close to 0.9, the model will be accepted as RMSEA is below 0.08 (0.069). This means that the model is parsimonious as the values are close to 0.9.

Also similarly when all the SAT is tested as a complete mediator with loyalty, the path analysis is shown as above. This shows that SAT is a partial mediator rather than a complete mediator. Therefore, Hypothesis 8 is accepted since it is not a complete mediator.

## 5. CONCLUSION

Out of 8 hypotheses, 5 were accepted, and 3 were rejected. One was rejected as the study found that social values have a negative influence on satisfaction, which is contradictory to Hypothesis 1. Overall, this study concluded that EPV and CV have a positive and significant impact on SAT. Also EPV and SAT have a positive and significant impact on brand loyalty. However, SV has a negative impact on SAT and loyalty in the full model and the mediator model as well. Therefore, EPV and CV are important dimensions or values associated with automobile brands in Saudi Arabia and they affect customer satisfactions and brand loyalty.

This study is also important for automobile manufacturers and dealers as regards allocation of resources and designing marketing campaigns. Managers must ensure that they are aware of the epistemic and social values associated with the cars in the Saudi Arabian market. Similarly, what is important for Saudi Arabian customers is the acceptance of their friends, family and colleagues when they buy an automobile. This means that the existing customers' perception and their satisfaction might result in positive word of mouth causing their relatives, colleagues and others to purchase the product from the same company or brand. Marketers and companies should consider social acceptance and must engage in constantly identifying the customer needs and wants.

For future researchers, it is important to increase the sample size and use a more appropriate sample design and data collection approach using appropriate strata based on the market share or based on the number of vehicles of each brand available on the market.

## COMPETING INTERESTS

The author has declared that no competing interests exist.

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# Influence of Retail Atmospherics as Nonverbal Communication on Purchase Behaviour in the Nigerian Retail Environment

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## ABSTRACT

This paper focuses on unravelling the impact of atmospherics on shopper purchase behaviour in emerging markets like Nigeria and attempts to isolate the atmospheric cue that is the most significant predictor of shopper purchase decisions. The paper seeks to establish a correlation between the design, ambient and social cues in big shopping malls and buyer purchase behaviour. A quantitative and deductive approach is adopted. Data collection is through a survey, and the principal research instrument is the questionnaire. Results reveal that retail atmospherics exert some significant influence on shopper purchase behaviour. Empirical analysis indicates that retail atmospherics account for 34% of shopper purchase behaviour and that design cues are the most significant predictor of shopper purchase decision followed by ambient cues. Social cues do not exert any influence on purchase decisions. A 'moderation' and 'mediation' analysis revealed that though design and ambient cues influence purchase decisions independently, the interaction effect on each other is not significant. Consequently, there is a need to understand why social factors do not play a role in purchase behaviour. More importantly, there is the need to identify and understand other factors that account for the balance of 66% in shoppers' buying behaviour. Such a study might focus on factors such as pricing, sales promotion, loyalty programmes and other psycho-social factors which may work as key influencers in customers purchase decisions. For practical purposes, the focus should be on the design and ambient cues in the conceptualisation, development, and management of large retail stores.

## 1. INTRODUCTION

### 1.1. Background

The primary focus of communication is on the how, why, and with what effects people communicate through spoken language and associated nonverbal messages (Association of Communication Administration, 1981). According to Lasswell (1948), one of the essential functions of communications is the surveillance of the environment and responding to stimuli inherent in such environment. Such responses could be either psychological, physiological or in some cases behavioural. Consequently, the environment where we find ourselves plays a significant role in the way humans interpret both verbal and nonverbal cues emanating from such environment. Communication has two central components: verbal and nonverbal. The verbal part refers to spoken words we use during communication while the nonverbal one often refers to communication that is produced by some means other than words (Knapp and Hall, 2002). Recently, there has been an exponential growth in interest and consequent research in the role of nonverbal behaviour in communication in relation to a broad range of behaviours (Buck and VanLear, 2002). Of great interest are atmospheric elements inherent in retail store environments and the role they play in the shopper purchase decisions.

Over the years, scholars and practitioners in the field of marketing and psychology have been interested in the reason why people buy and have made giant strides in understanding the key drivers of purchase decisions. The need for this study arose out of the shift in attention to the Nigerian market by major global retail chains, the increasing sophistication of the Nigerian shopper, and the limited resources available to satisfy human needs. Other factors include the advent of online retail stores like Jumia, Konga, Yudala, Kaymu and many others in Nigeria. With the malls came the promise of quality, convenience, after-sales service and total shopper satisfaction. These malls leverage on both verbal and nonverbal communication to achieve their business objectives. The structure and size of the shops, lighting, colours, merchandising, air-conditioning, and music are examples of atmospheric cues utilised to communicate nonverbally to shoppers.

While vast financial resources are invested by the management of these malls in Nigeria, there is a need to drill further down to unearth the level of influence of these atmospheric cues on purchase behaviour, especially in the Nigerian retail space. Though the general perception is that they do exert some influence, there is a need to identify which atmospheric cues exert the most significant influence on customer purchase behaviour. A clear understanding of shopper purchase behaviour in response to the myriads of atmospheric cues that exist in modern trade outlets will be critical to customer satisfaction and loyalty. It is, therefore, imperative to understand the effectiveness of this shopper attraction and retention strategy.

Globally, some studies have been carried out on retail atmospherics and customer behaviour. However, only a few focus on emerging markets such as Nigeria and none has approached the subject from a broad perspective that incorporates the categorisation of store atmospherics by Baker et. al. (1986) and their influence on shopper purchase behaviour. Attempts within the Nigerian space to study atmospherics focused on 'store layout and customer loyalty' (Onuoha and Nnennaya, 2017); 'atmospherics and patronage in the banking sector' (Adiele and Nwaeke, 2015); and 'store atmosphere and impulse buying' (Ukpabi et al., 2015). Consequently, this paper is unique in its originality as it adopts a holistic approach to understanding retail atmospherics as it affects shopper purchase behaviour. The study promises to add to scholarly knowledge by dissecting the influence of atmospheric cues on purchase behaviour and isolating the atmospheric cues that exert the most significant influence on shopper purchase behaviour.

## 1.2. The Place of Retail Space in the Marketing Mix

A crucial and vital component of the marketing mix is 'place' which is the point of interface between a business organisation with other elements of the marketing mix (product, price, and promotion) and the consumers. The centrality of 'place' is evident because the physical environment of retail outlets influences how customers feel (Baker et al., 2002). Place refers to the channels used to get an organisation's product to its clients. In response to competition and the need to elicit customer loyalty, 'place' has become an arena that attracts a high level of creativity and innovation in the marketing value chain. The overarching objective is to create the right environment for sales to thrive. An appropriate place strategy will result in making goods available to consumers at the right location and time.

Aside from developing the right product, deploying customer-friendly price and educating both existing and potential customers on the key benefits of the product, 'place' is gradually becoming a key component of all marketing strategies. Most manufacturers and service providers have long acknowledged the centrality of the business environment – be it a mall, a retail shop, a banking hall or the reception area of a multinational organisation – as playing a key role in creating the right stimulus to attract and retain desired customers. In malls, manufacturers and supplier of goods go the extra mile to assist in creating the right ambience using various atmospheric cues that will make for a positive shopping experience. This is because the products on display at competing stores are often perceived as similar – hence the need for differentiation, leveraging on the environment.

## 1.3. Evolution of Retail Atmospherics as Nonverbal Communication

One of the mixed blessings of human history is that humans increasingly live, work, and play in an artificial environment (Kotler, 1973). The physical retail environment has provided the setting for consumer engagement and has become the focus of retailers and brand owners (Ogden-Barnes and Barclay, 2011). Fundamental advances in business processes include the recognition that people, in their purchase decision-making, respond to more than only a tangible product or service on offer (Kotler, 1973). Mulhern (1997) argues that retail business has experienced a shift in focus from traditional merchandising with its attendant attention to the marketing mix elements, to more active customer engagement and management through a more integrated approach. The emphasis, therefore, has now been placed on customer relationships, motivating and rewarding loyal customers and, at the same time, maintaining a cordial relationship with manufacturers.

Place design and management have been identified as an essential marketing tool in building and sustaining brand equity. Trade channels are seen as points of consumer contact and engagement. The business of selecting and managing retailers for a specific brand is taken seriously by manufacturers as it can lead to customer satisfaction. Dodds, Kent and Dhruv (1991) identify significant positive effects of store image on the perceived quality of merchandise. In some cases, the name of the retail outlet is a strong pointer to perceived quality, and this is why the quality of a given brand is seen differently depending on where it is on offer. Customer traffic may likely be greater in a store with a positive atmosphere than in one with a negative atmosphere. Also, such stores provide greater customer satisfaction which leads to good will, loyalty and also stimulates word of mouth recommendations (Rao and Monroe, 1989; Zeithaml, 1988).

With the traditional retail channels in Nigeria giving way to modern malls (Shoprite, Game, Spar, Mega Plaza, and others), there is an increasing desire among these modern trade channels to compete favourably with the aim of increasing their bottom line. This remarkable increase in competition within the modern trade channels, in turn, stimulates the need to devise ways of achieving differentiation in the retail offering (Morrison et al., 2011). Aside from offering good quality products in line with consumer demands, malls now consider other factors like shelf

design, lighting, colour, merchandising, music, sampling as forms of nonverbal communication in their aim to create an optimal shopping environment.

Research has identified three primary sets of atmospheric cues utilised in many retail environments. These are design, ambient, and social factors (Baker, 1986).

**Table 1**
Classification of atmospheric cues

| COMPONENTS OF THE PHYSICAL STORE ENVIRONMENT | | | |
|---|---|---|---|
| **Ambient Factors** | Represented by background conditions that exist below the level of our immediate awareness | **Air quality**<br>• **(**Temperature/humidity/circulation/ventilation)<br>**Noise** (Level & pitch)<br>**Scent**<br>**Cleanliness** | |
| **Design Factors** | Represent stimuli that exist at the forefront of our awareness | **Aesthetics**<br>• *Architecture*<br>• *Colour / style*<br>• *Materials / décor*<br>• *Scale / shape*<br>• *Texture / pattern* | **Functional**<br>• *Layout*<br>• *Comfort*<br>• *Shelf design*<br>• *Signage*<br>• *Accessories* |
| **Social Factors** | Refer to people in the environment | **Audience (Customers)**<br>• *Number*<br>• *Appearance*<br>• *Behaviour* | **Service personnel**<br>• *Number*<br>• *Appearance*<br>• *Behaviour* |

Source: Baker et al. (1986)

## 1.4. Emergence of Modern Trade in Nigeria

It is obvious that the recession in Europe and North America at the dawn of the new millennium has led to a shift in attention towards the African market. The focus is largely on the Nigerian market probably because of the perceived large consumer population. Consequently, the Nigerian economy has witnessed an influx of foreign enterprises, multinationals, and mega retail chains which has led many economic analysts to predict a phenomenal growth in the Nigerian economy within the next five years. This was boosted by the rebasing of the economy in 2014, which resulted in Nigeria evolving to be the biggest economy in Africa (The Economist, 2014), even though the dwindling oil revenue and current recession have caused Nigeria to drop to the second position in 2016.

This trend has led to the entry into the Nigerian market of big names in the global retail industry such as Spar, Shoprite, Mr Price, Woolworths and Game with more on the way. These retail chains came with promises of convenience, quality assurance, and after-sales service. As shoppers get more health conscious and more sophisticated, the perception that products sold in these malls are healthier and offer better quality than those sold in the open markets increases. Observation has revealed that products that require storage in particular environmental conditions are seen lying under the hot sun in the traditional open markets as is evident in the popular Alaba, Idumota, Oke-Arin and Ojuwoye markets in Lagos. Today, shoppers view these practices as health risks and thus will queue for fresh bread from the oven at Shoprite rather than buy from roadside shops and open markets.

## 2. LITERATURE REVIEW

### 2.1. Introduction

Based on the classical premise of environmental psychology, studies on customer purchase behaviours often take the position that a retail store environment arouses certain specific emotions in customers. Extant literature has shown that consumers respond not only to the core product on offer during their purchase decision-making process but also to the total product. An essential component of the total product is the place where the product is purchased. In particular cases, the location of purchase, or more appropriately the retail atmosphere exerts more influence on purchase decisions than the core product itself (Kotler, 1973). Consequently, there have been concerted efforts within the academia to study the extent of influence of retail atmosphere on consumer purchase behaviour. While some of these studies were approached from a holistic (all the environmental cues) standpoint (Kotler, 1973; Turley and Milliman 2000; Puccinelli et al., 2009; Kumar et al., 2010; Chen and Hsieh, 2011; Joshi and Kulkarni, 2012; Bohl, 2012; Grewal et al., 2014; Singh et al., 2014), others focus on specific atmospheric cues such as background music (Santos and Freire, 2013; Milliman, 1982), store space (Markin et al., 1976), crowding (Eroglu and Harrell, 1986; Hui and Bateson, 1991), music and lighting and social interaction (Baker et al., 1992).

In a study focusing on the Taiwanese market, Chen and Hsieh (2011) revealed that store atmospheric factors have a significant positive correlation with customer approach behaviours, design factors being the most significant among all factors. This confirms the views of Bitner (1992), who believes that shoppers tend to avoid unpleasant environments and approach those with the likelihood of making them happy. Consequently, by manipulating design and ambient factors, retail store operators can create a pleasant store atmosphere that can make for a more experiential and enjoyable shopping experience.

The use of music has been applied in traditional areas such as psychology, through the discipline of environmental psychology (Donovan and Rossiter, 1982). Music variations such as how fast or slow, type and popularity influence consumers' mood (Yalch and Spangenberg, 2000); time spent in shops (Kellaris and Altech, 1992; Kellaris and Kent, 1992), customer emotions (Mehrabian and Russell, 1974) and shopper purchase decisions (Santos and Freire, 2013). Smith and Curnow (1966) stated that time spent in a retail store and sales were adversely related to 'loud' music. Time spent in stores was significantly shorter when music was loud. Meanwhile, total sales were not influenced by music loudness. However, they noted an increase in sales per minute because customers were found to spend less time within the store (Smith and Curnow, 1966).

A clear understanding of customers' colour preferences will facilitate the creation, development, and communication of the store image. For most customers, different colours are associated with different meanings which are tied to their individual or communal culture. The Chinese associate white with death, unlike some other cultures that associate it with peace. Understanding attitudes towards colours and their interpretation beyond textual context can help add value to a retail store image.

Areni and Kim (1994) state that olfactory factors such as scent, freshness and tactile factors such as temperature help in creating a calming and friendly atmosphere in a retail store. These factors contribute to the store image by eliciting an aesthetically sensitive disposition, enhancing the store's merchandise quality, its clientele, and their comfort. Tactile factors such as temperature, smoothness of walls, furnishings, and floors also create an aesthetically sensitive atmosphere that can increase customers' value as a result of personal comfort. In the tropics, consumers often choose stores with air-conditioning because of the relatively humid climate. Availability of air cooling systems increases customer's exploratory tendencies within a retail store environment.

These factors have the potential to change shoppers' emotional experiences such as anxiety, lack of interest, foul mood and uneasiness in a public place (Grossbart et al., 1990).

Design cues like the layout, shelf design, signage, décor can create an attractive and unique environment that appeals to people by signalling a pleasant experience. Customers can develop positive associations of trust, value, quality of goods and services, price, warranty and guarantee, and other factors, as they come across visuals such as signage, window dressing, logo, and others, based on past shopping experiences (Kumar et al., 2010). Graphic materials used throughout the retail environment can act as a link between the merchandise on display and the target market. In a study carried out in Port Harcourt, Nigeria, Ukpabi et al. (2015) confirmed that store interior, layout, and display all had a positive correlation with impulse buying.

Crowding in the context of the retail environment consist of both human and spatial crowding (Eroglu et al. 2005) and is calculated based on the specific number of shoppers within a retail store environment at a particular time. Crowding can result in some discomfort among customers depending on their level of tolerance and the number of shelves, furnishing, and inventory that might impinge on smooth navigation within the store area. In the case of excessive crowding, customers find it difficult to move around the store, thereby blocking their perceived shopping goal (Grossbart et al., 1990).

## 2.2. Models of Shopper Behaviour

The notion that store atmospherics exert some influence on consumer behaviour was first introduced to marketing research by Kotler (1973). However, most current research on retail atmospherics leverages, to a large extent, on the Mehrabian-Russell model, which is at the core of a study area referred to as 'environmental psychology' and was first applied to retail settings by Donovan and Rossiter (1982). The field of environmental psychology is concerned with two broad segments: the direct impact of physical stimuli on human emotions and the effect of the physical stimuli on a variety of behaviours, such as work performance or social interaction (Mehrabian and Russell, 1974).

Mehrabian and Russell (1974), in developing a framework for analysing the effects of environment on humans, emphasised the role of nonverbal responses to environmental factors as a major determinant of human behaviour. According to them, the retail store environment contains various stimuli that might be perceived by the customer's senses.

**Figure 1**
Mehrabian and Russell's SOR framework
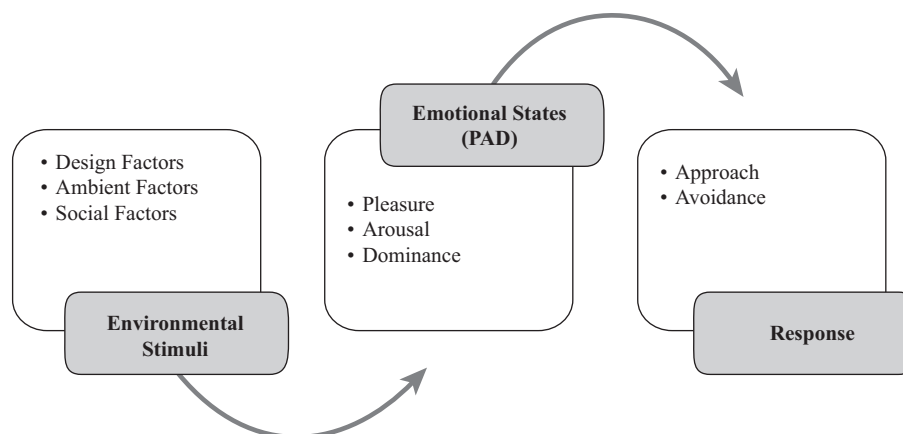


Source: Adapted from Mehrabian and Russell (1984)

The framework in Figure 1 above shows that people react to their environment along at least three dimensions: Pleasure, Arousal, and Dominance (PAD). The last section of the

Mehrabian-Russell framework is a list of possible behavioural reactions to the environment. Even though some shopping behaviours can be affected in different ways by environmental factors, Mehrabian and Russell (1974) classify the effects along the line of approach or avoidance. Consequently, retail environments could be constructed or designed to encourage shoppers to approach a shop or discourage them from entering. Thus, within the retail store environment, it is confirmed that stimuli that elicit positive emotional responses almost always lead to approach behaviours, whereas those that elicit negative emotional responses result in avoidance (de Farias et al., 2014).

## 3. METHODS AND PROCEDURE

### 3.1. Research Design

Based on the Mehrabian-Russell S-O-R framework, this study sought to create an understanding of how retail atmospherics influence customers' purchase behaviour given the shift from shopping in traditional shops to malls in Lagos, Nigeria. The research design is shown in Figure 2 below.

**Figure 2**
Framework for research methodology
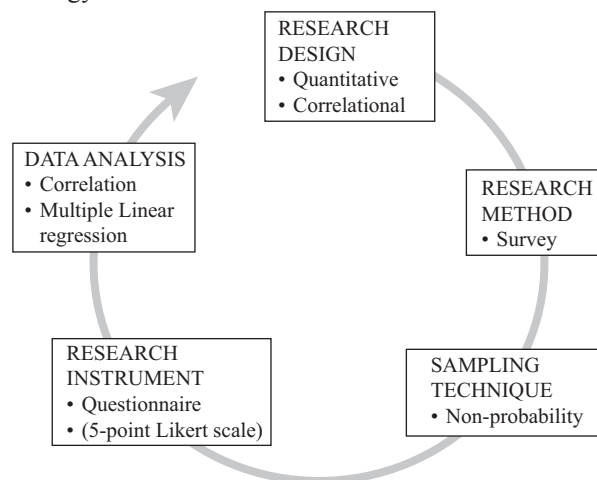


Source: authors

### 3.2. Research questions

A clear understanding of shopper purchase behaviour in response to the myriads of atmospheric cues that exist in modern trade outlets (malls) is crucial to customer satisfaction and loyalty. An enormous amount of financial and material resources is always spent on creating the 'right' ambience and an environment that promises to impact positively on shoppers' purchase decisions. It is, therefore, imperative to understand the effectiveness of this shopper attraction and retention strategy. The key research questions, therefore, include:
1. What atmospheric cues are mostly utilised at shopping malls?
2. In what way does an atmospheric cue relate with shopper purchase behaviour?
3. Which category of atmospheric cues significantly predicts a purchase decision?
4. What form of relationship exists between predictors of purchase behaviour?

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### 3.3. Population, Questionnaire Design and Sampling Plan

The population of study refers to customers, shoppers, and individuals of varied socio-economic classes who visit shopping malls in Lagos, the most populous city in Nigeria, for the purpose of making a purchase. Leveraging on a pilot study conducted by observation and counting of shoppers at four major malls, the mean daily population of 1,057 is arrived at. This population was calculated from a weekday average of 800 visitors (Monday to Friday) and a weekend average (Saturday and Sunday) of 1,200 shoppers. Using a sample size calculator with a confidence interval of 5.0, a 95% confidence level, a standard deviation of .5 and a population of 1,057 customers, a sample of 283 respondents was drawn. A non-probability sampling technique was adopted as respondents were selected based on accessibility.

The questionnaire was designed to reflect and address the key independent and dependent variables identified within the subject. These are arranged in sections, taking into account the different categories of atmospheric cues and purchase behaviour. Section A contains questions that address the key elements of the independent variables (ambient, design and social), applying Baker's (1986) classification of atmospheric elements. Section B focuses on questions that address the dependent variable (shopper purchase behaviour). All questions applied the 5-point Likert scale (Strongly Disagree = 1, Disagree = 2, Undecided = 3, Agree = 4 and Strongly Agree = 5).

A pilot sample of 100 respondents was used, and a reliability analysis check using Cronbach Alpha was carried out on the questionnaire questions in the three categories of atmospheric cues (design, ambient, and social) and purchase behaviour.

**Table 2**
Reliability analysis check for questionnaire questions

| Questionnaire Reliability Analysis Check | | |
|---|---|---|
| Cues | Cronbach Alpha | Range of item correlations |
| Design Cue | .67 | .38 /.46 |
| Ambient Cue | .66 | .33/.44 |
| Social Cue | .49 | .20/.39 |
| Retail atmospherics (Composite scale) | .75 | .10/.55 |
| Purchase Behaviour | .61 | .23/.44 |

Note: The low Cronbach alpha value for Social cue is accepted in consideration of the total mean values.

Source: authors using Cronbach Alpha

### 5. RESULTS

This study leverages on Baker's (1986) broad classification of atmospheric cues in the retail environment. The research instrument was administered to respondents to unearth the relationship between atmospheric cues and purchase behaviour. Answers to all questions as contained in the questionnaires were coded and then analysed using statistical applications (SPSS and Amos). Each category of the independent variables (Design, Ambient, and Social) was measured against purchase behaviour. Finally, the independent variables were tested for moderation and mediation. The results obtained indicate that 51% of respondents have been buying from the selected malls for upward of five years (see Table 3 below).

**Table 3**
Length of time as customer

| Number of Years as a Customer | | Frequency | Percent | Valid Percent | Cumulative Percent |
|---|---|---|---|---|---|
| Valid | Less than a month | 34 | 12.0 | 12.1 | 12.1 |
| | Up to 6 months | 38 | 13.4 | 13.5 | 25.5 |
| | Up to a year | 65 | 22.9 | 23.0 | 48.6 |
| | Up to 5 years | 145 | 51.1 | 51.4 | 100.0 |
| | Total | 282 | 99.3 | 100.0 | |
| Missing | System | 2 | .7 | | |
| Total | | 284 | 100.0 | | |

Source: authors using SPSS

This is an indication that these malls enjoy a high level of loyalty from their patrons. Those shoppers who have visited the mall for less than a month represent just 12% of the total shoppers at the mall.

## *Frequency of visit*

**Table 4**
Frequency of visits

| Frequency of Visit | | Frequency | Percent | Valid Percent | Cumulative Percent |
|---|---|---|---|---|---|
| Valid | Once a day | 44 | 15.5 | 15.6 | 15.6 |
| | Once in 2 days | 33 | 11.6 | 11.7 | 27.3 |
| | Once in a week | 89 | 31.3 | 31.6 | 58.9 |
| | Twice a month | 57 | 20.1 | 20.2 | 79.1 |
| | Once in a month | 59 | 20.8 | 20.9 | 100.0 |
| | Total | 282 | 99.3 | 100.0 | |
| Missing | System | 2 | .7 | | |
| Total | | 284 | 100.0 | | |

Source: authors using SPSS

The result here shows that 32% of the shoppers visit the mall at least once in a week. This, to a large extent, supports the notion that most families shop weekly for household items. The result also supports the high percentage of loyal customers seen in the result from general question number two above.

## *Key Atmospheric Cues in Retail Space*

A frequency count of the positive responses (strongly agree and agree alone) from respondents while discounting the negative responses (strongly disagree, disagree and undecided) shows that the atmospheric cue most important to shoppers is the location (a design cue) followed by lighting (an ambient cue). Queues are the least attractive to most customers.

**Table 5**
Key atmospheric cues

| | | Key Atmospheric Cues in Retail Space | |
|---|---|---|---|
| **S/NO** | **Categories** | **Variables** | **Percentage** |
| 1 | Design Factors | Location | 87.4 |
| 2 | | General structure | 80.3 |
| 3 | | Shelves | 80.6 |
| 4 | | Ease of browsing | 73.5 |
| 5 | | Product arrangement | 84.1 |
| 6 | Ambient Factors | Colour | 70.8 |
| 7 | | Lighting | 86.7 |
| 8 | | Scent / fragrance | 61.6 |
| 9 | | Sound | 66.9 |
| 10 | | Music | 54.9 |
| 11 | | Temperature | 66.9 |
| 12 | Social Factors | Product demo | 59.5 |
| 13 | | Queues | 36.6 |
| 14 | | Crowding | 37.1 |
| 15 | | Noise | 41.3 |
| 16 | | Staff | 78.2 |
| 17 | | Mall attendants | 48.2 |

Source: authors using SPSS

However, using the mean values of all data from respondents which link the atmospheric variables to the purchase behaviour variables, it was observed that ambient cues account for a higher proportion of atmospheric cues deployed and utilised at the malls.

**Table 6**
Mean value of key atmospherics

| | Mean Value of Key Atmospherics | | |
|---|---|---|---|
| **Atmospheric Cue** | **Mean** | **Standard Deviation** | **Ranking** |
| Design | 19.31 | 2.98 | 2 |
| Ambient | 21.90 | 3.50 | 1 |
| Social | 18.99 | 3.45 | 3 |

Source: authors using SPSS

Using statistical tools and based on the average values, ambient cue (21.90) is deployed more and attracts more attention from the management of malls compared to other cues: design cue (19.31) and social cue (18.99).

### *Relationship Between Retail Atmospherics and Purchase Behaviour*

**Table 7**
Correlation between atmospherics and purchase behaviour

| Correlation Between Atmospherics and Purchase Behaviour | | | |
|---|---|---|---|
| | | Atmospheric Cue | Purchase Behaviour |
| **Atmospheric Cue** | Pearson Correlation | 1 | .335** |
| | Sig. (2-tailed) | | .000 |
| | N | 282 | 282 |
| **Purchase Behaviour** | Pearson Correlation | .335** | 1 |
| | Sig. (2-tailed) | .000 | |
| | N | 282 | 284 |

**. Correlation is significant at the 0.01 level (2-tailed).

| | Purchase Behaviour | Significance |
|---|---|---|
| Atmospheric Cue | .34** | P<.01 |
| N (282) | | |

**P<.01 at 2-tailed

Source: authors using SPSS

The table above shows that there is a positive correlation between the atmospheric cues at the malls and customers' purchase behaviour since correlation is significant at the 0.01 level with $P<.01$. The result above confirms that purchase behaviour in malls is positively influenced by atmospherics.

### *Key Predictor of Purchase Behaviour*

**Table 8**
Key predictor of purchase behaviour

| Coefficients^a | | | | | | |
|---|---|---|---|---|---|---|
| Model | Unstandardised Coefficients | | Standardised Coefficients | t | Sig. | Collinearity Statistics |
| | B | Std. Error | Beta | | | Tolerance |
| 1 (Constant) | 10.982 | 1.345 | | 8.165 | .000 | |
| Design cue | .278 | .067 | .277 | 4.167 | .000 | .700 |
| Ambient cue | .113 | .057 | .132 | 1.973 | .049 | .690 |
| Social cue | .019 | .051 | .021 | .364 | .716 | .898 |

| | B | SEB | β |
|---|---|---|---|
| Constant | 10.98 | 1.35 | |
| Design cues | .28 | .07 | .28** |
| Ambient cues | .11 | .06 | .13* |
| Social cues | .02 | .05 | .71 |

**P<.01 *P<.05 Dependent variable Purchase decision

Source: authors using SPSS

$$Y = a + B_1 x_1 + B_2 X_2$$

The result above shows that for every one unit increase in design cues, a shopper's purchase decision increases by a value of .28 of a standard deviation at P<.01. This value confirms that design cues are significant positive predictors of shopper purchase behaviour, and proves that the positive prediction of purchase behaviour by design cues does not arise out of error. Furthermore, the results also show that for every one unit increase in ambient cues, a shopper's purchase decision increases by a value of .13 of a standard deviation at P<.05. Thus, the ambient cue is a significant predictor of shopper purchase decisions. With a value of P>.05, social cues do not predict a purchase decision.

### Test for Moderation Effect of Key Predictors of Purchase Behaviour

A test for moderation between ambient and design cues showed non-significance and thus does not tell any different story. However, design and ambience cues independently continue to exhibit a significant relationship with purchase behaviour. Consequently, the variables are not moderators by themselves for purchase behaviour (see table below).

**Table 9**
Test for moderation

| Tests of Between-Subjects Effects | | | | | | |
|---|---|---|---|---|---|---|
| Dependent Variable: Purchase Behaviour | | | | | | |
| Source | Type III Sum of Squares | df | Mean Square | F | Sig. | Partial Eta Squared |
| *Corrected Model* | 275.705[a] | 3 | 91.902 | 11.307 | .000 | .108 |
| *Intercept* | 89613.371 | 1 | 89613.371 | 11025.193 | .000 | .975 |
| *Design* | 98.506 | 1 | 98.506 | 12.119 | .001 | .041 |
| *Ambient* | 107.850 | 1 | 107.850 | 13.269 | .000 | .045 |
| *Design * Ambient* | 7.483 | 1 | 7.483 | .921 | .338 | .003 |
| *Error* | 2275.855 | 280 | 8.128 | | | |
| *Total* | 107253.000 | 284 | | | | |
| *Corrected Total* | 2551.560 | 283 | | | | |

a.  R Squared = .108 (Adjusted R Squared = .098)
b.  The design and ambient data were split into two by the mean values to achieve the categories

Source: authors using SPSS

Testing for the Mediation Effect of Ambience
A test for the mediation effect of ambient cues on design cues also showed non-significance even though they independently exhibit a significant relationship with purchase behaviour. Since the previous statistical analysis indicates that the design cue is the most important predictor of purchase behaviour, a test was carried out to investigate the mediating effect of ambience on design cues. The key assumptions for Mediation is that the mediator (Ambience) must have a significant relationship with the dependent variable (Purchase Behaviour) and the predictor (Design). However, in the results below, the mediator has a significant association with the independent variable, but no relationship with the dependent variable. Thus, the assumptions for mediation are violated.

**Figure 3**
Framework for mediation
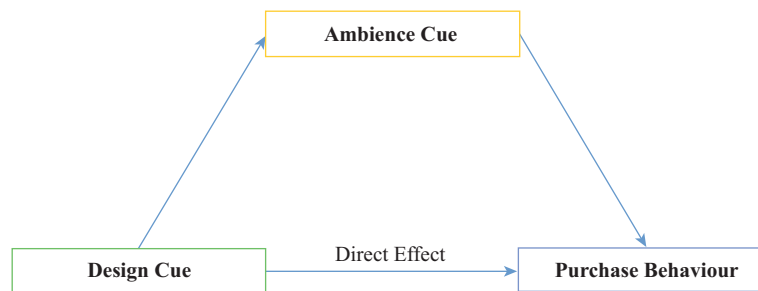


Source: authors

Before Mediation, the direct effect of design on purchase behaviour is significant, P<.001. However, the study indicated that after the Mediation effect of ambience is tested, the direct influence of design drops from .32 to .28, and is insignificant, but the indirect effect of the mediator (ambient) is violated as ambience did not show significant relationships with purchase behaviour (see mediation analysis below).

**Table 10**
Test for Mediation – before mediation

|      |      |   | Estimate | S.E. | C.R. | P | Label |
|------|------|---|----------|------|------|---|-------|
| pb | <--- | d | **.323** | .096 | 3.376 | *** | par_1 |

Source: authors using Amos

**Table 11**
Test for Mediation – after mediation

|      |      |     | Estimate | S.E | C.R | P |
|------|------|-----|----------|-----|-----|---|
| AM | <--- | d | .474 | .119 | 3.994 | *** |
| pb | <--- | d | **.281** | .191 | 1.473 | .141 |
| pb | <--- | AM | -.022 | .329 | -.066 | .947 |

Source: authors using Amos

**Figure 4**
Effects before and after mediation
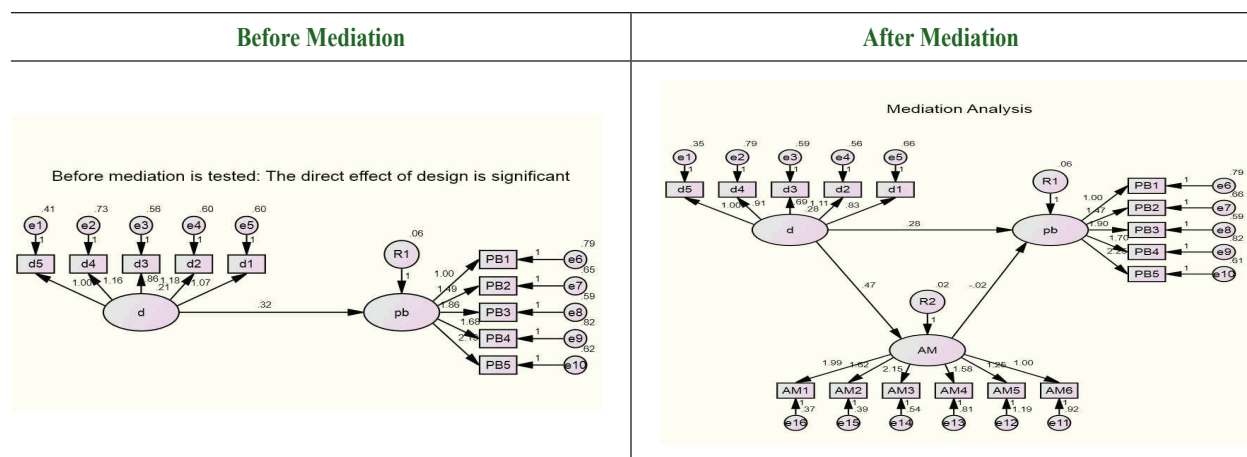


Source: authors using Amos

## 6. FINDINGS AND DISCUSSION

### 6.1. Findings

By using relevant statistics, this study confirms that there is a positive relationship between retail atmospherics and customer purchase behaviour with the relationship at 34%. The study also revealed that design factors and ambient factors significantly influence purchase behaviour with design factors being the highest predictor of purchase behaviour, while social cues do not exert significant influence on customers' purchase decisions. Consequently, the results can be summarised as follows:

**Table 12**
Summary of outcomes

| | |
|---|---|
| *Outcome 1* | Mean values of all data from respondents linking the atmospheric variables to the purchase behaviour variables revealed that ambient factors at 21.9 account for a higher proportion of the cues utilised at the malls. |
| *Outcome 2* | There is a positive correlation between retail atmospherics and customer purchase behaviour with atmospherics accounting for 34% of a shopper's purchase decision. This is an indication that the correlation is significant at the 0.01 level with P<.01. |
| *Outcome 3* | Statistical analysis shows that for every one unit increase in design cues, a shopper's purchase decision increases by a value of .28 of a standard deviation at P<.01. On the other hand, for every one unit increase in ambience, a shopper's purchase decision increases by a value of .13 of a standard deviation at P<.05. Thus, design cues with an associated value of P<.01 are significant and their positive prediction of purchase behaviour did not arise out of error. Hence, design cues are the most significant predictor of purchase behaviour. Though there exists a positive relationship between the ambient cue and purchase behaviour, it is not as significant as design cues. With a value of P>.05, social cues do not predict a purchase decision. Thus, *Purchase decision = 10.98 + .28Design + .13Ambient* |
| *Outcome 4* | By relying on statistical tools, the study shows that the interactions between design and ambient cues are not significant! Thus we may conclude that the variables do not have any moderation on each other. Though both variables independently are significant predictors of purchase behaviour, there is no evidence of an interaction effect of both variables on purchase behaviour. The study also indicated that there is no mediation effect – partial or full – of the ambient cue on the relationship between design cue and purchase behaviour. |

Source: authors

### 6.2. Discussion

Consumers appear to perceive retail environments in an ambient, holistic manner, such that they have direct and provider-mediated effects on outcomes (Morin et al., 2007). According to Chen and Hsieh (2011), all store atmospheric factors, except for environmental crowding, have a significant impact on customer approach behaviours in large supermarkets in Taiwan. This study can, therefore, be seen as a confirmatory study of the position of Chen and Hsieh (2011). In-depth analysis of data collected from respondents shows that both design and ambient factors play a significant role in customer purchase behaviour. By ranking the outcomes according to their level of significance, design cues came out as the most significant predictor of purchase behaviour followed by ambient cues. A further test of mediation and moderation on design and ambient cues shows that while both independently influence purchase behaviour, the interaction effect of both variables on purchase behaviour is not significant. Thus, there is neither a moderation effect nor a mediation effect on each other.

This result is a clear pointer to the level of growth and development of the formal retail sector in Nigeria. The emergence of this sector as exemplified by large shopping malls is still a new

phenomenon as a majority of the populace still patronise the informal, open market for shopping. Consequently, the design aspects of retail stores have been seen as an ideal convergence of artistic ideas, instinct, and business in a planned and profitable manner (Kumar et al., 2010). Customers find the general layout of the malls, the positioning of shelves, signage, and arrangement of products on the shelves very attractive. Thus, there is a need for retailers to consistently create or identify new locations where space, cost, and flexibility are designed in such a way that they effectively communicate brand value and attract consumers (Din, 2000). The general layout of a retail store, therefore, can communicate value by increasing comfort, product quality, price, the size of inventory and efficiency in browsing through the shelves. These shoppers are willing to pay more for a product seen in a big shopping mall than in traffic or open markets in Lagos. One can assert that favourable environment facilitates the development of positive associations of trust, value, and quality.

The effect of ambient cues on shopper behaviour supports man's innate attraction to a relaxed environment. The combination of fragrance, lighting, air-conditioning, the colour of painting creates a relaxed and welcoming atmosphere at malls. Areni and Kim (1994) were able to relate in-store illumination, shopper's cognition, the perception of value and consumption patterns to consumers' arousal and vision. At variance with the results of this study, earlier studies on retail atmospherics tend to support the view that crowding has a negative influence on consumer evaluations of the shopping experience (Turley and Milliman, 2000). Crowding has a negative impact on browsing and comparison shopping, some purchases, postponed shopping, going to another shop (Grossbart et al., 1990) and quality perceptions (Wakefield and Blodgett, 2002) seen in Turley and Milliman (2000). This view is supported by Chen and Hsieh (2011) and Graa et al. (2014). Conversely, Joshi and Kulkarni (2012) and Singh et al. (2014) arrived at the conclusion that social cues do indeed exert a positive influence on shopper behaviour. However, the results here indicate that malls represent a significant improvement with regard to crowding when compared with the huge crowds that characterise the open markets in Nigeria. Hence, crowding, a social cue, does not have a significant influence on shopper purchase behaviour.

The non-significance of social cues on shopper purchase behaviour can be attributed to the fact that unlike clubs and bars, most malls in Nigeria are not designed with socialisation in mind. Again, because they are located in the major cities as against rural areas, the probability of meeting an acquaintance within the mall is little. For most shoppers, a visit to the mall is primarily to shop and not to socialise. Through direct observation, it was noticed that most shoppers were in a hurry to leave after shopping and had little or no time for socialisation.

Testing for mediation and moderation between design and ambient cues reveals some fascinating facts. The results for both tests turned out to be insignificant. The non-significance is not surprising in an environment where the primary touch point for shoppers are the open markets and neighbourhood shops where both design and ambient factors are relegated to the background. The emergence of modern trade (malls) in Nigeria is a recent phenomenon, and it will take a while for shoppers to get used to the positive atmosphere promised by these malls and see them as standard in their shopping experience.

In summary, even though design and ambient cues significantly influence shopper behaviour, customers will still buy in unsophisticated ambient and design.

## 7. CONCLUSION

This research has further proven the relevance of the Stimulus – Organism – Response (SOR) model of Mehrabian and Russell in shopper purchase behaviour. The study revealed that store-induced pleasure is robust enough to attract customers to a retail environment. Thus, people will

likely visit those shops that elicit pleasurable experience. Using the research objectives as spelt out for this study, the study concludes as follows:

• Malls deploy a variety of atmospheric elements in their bid towards attracting and retaining customers, but the most obvious are the ambient factors.
• There is a positive correlation between retail atmospherics and customer purchase behaviour with atmospherics accounting for 34%.
• Though ambient cues were found to influence buying behaviour, the most significant predictor of purchase behaviour is designed cues. Social cues do not play any significant role in customer purchase behaviour. Furthermore, there is no evidence of a moderating and mediating effect between the predictors of purchase behaviour. While design cues and ambient cues independently influence shopper purchase behaviour, there is no moderation or mediating effect of ambient cues on design cues.

There is a need to understand why social factors do not play a role in purchase behaviour and explore ways to incorporate socialisation in the purchase decision process of customers. Focus at this stage of development in modern trade should be on achieving conversion from shopping in the open markets and neighbourhood stores to large malls. This is because of the no moderation and mediation between the significant predictors of purchase behaviour. More importantly, there is the need to identify and understand other factors that account for the balance of 66% since this study has shown that atmospherics account for just 34% of shoppers' purchase behaviour. Such research might focus on factors such as pricing, sales promotion, loyalty programmes and other psycho-social factors which may work as key influencers in customers purchase decisions.

The Nigerian retailer needs to consistently create or identify new locations where space, cost, and flexibility are designed in such a way that they effectively communicate brand value and attract consumers (Din, 2000). This is because the general layout of a retail store can communicate value by increasing comfort, product quality, price, the size of inventory and efficiency in browsing through the shelves. The effect of ambient cues on shopper behaviour supports man's innate attraction to a relaxed environment. The combination of lighting, air-conditioning and the colour of painting creates a relaxed and welcoming atmosphere and facilitates a smooth and stress-free shopping experience.

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# The Influence of Adult Children from "Generation Y" on the Shopping Decisions of their Parents

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## ABSTRACT

Family is one of the most important socio-cultural factors which reflects on a man's behavior. Contemporarily, young people demonstrate much more market activity. Except for doing shopping, they also play roles of advisors who influence choices of individual members of households. Most often, in spite of coming of age and leaving family home, they still have an impact on the behavior of family members. The aim of this paper is to examine the influence of children over 18 (generation "Y") on parents' consumer decisions (generation "X" and Baby-Boomers). As a research method a quantitative survey analysis was applied which showed that children have a relevant influence on shopping decisions of adults. Moreover, there are differences in the assessment of this influence between children and parents. The degree of young people's impact on the shopping process of their parents is, among others, determined by age and sex of a child and a parent, the category of the product and its purpose. The limitation of the conducted analysis is the unrepresentative sample of respondents. The achieved results may be used by marketing specialists to deepen their understanding of consumer behavior of adult children and their parents and to properly address promotion messages.

**JEL classification:** M00, D10, D70

**Keywords:** family, generation Y, consumer behaviour, young consumers, pester power

## 1. INTRODUCTION

The topic of this article is the influence of children over 18 years old on consumer behavior of their parents. Nowadays, young people, except for being active on the primary market, where they do autonomous shopping, also function on the secondary market. This market is characterized by the influence of children on consumer behavior of their parents who, as a result of their children's pressure, fulfill their wishes.

Children are characterized by a quality called 'a syndrome of an easy prey'. As a consequence of possessing it, they are more prone to the influence of promotion activities because they are not fully aware of the ways advertisements function. The level of their psychological development makes them prone to manipulations as their process of decision making is less rational than in case of adults (Acuff and Reiher, 2005). As a result, it is easier to influence parents' consumer behavior through the advertisements addressed to their children who later will use their pester power vis-à-vis them.

According to Ipsos research (2010), an average allowance of Polish children aged from 4 to 18 was PLN 56 a month, which is PLN 18 more than in 2004. Children used to receive money in a form of gifts from parents, grandparents or other relatives (56%), regular payments made by a father or a mother in order to fulfill their children's everyday needs (53%) or as a prize for receiving positive marks at school (13%). The oldest children aged 15–18 received higher allowance than younger ones. The results of the cited research show that children usually spend their money on sweets, while the least interest was shown in buying tickets to theatres, philharmonic halls and other cultural events.

The reason why the influence of adult children on their parents' shopping activities was chosen as the topic of this research is the fact that, so far, only the impact of children under 18 has been examined. In spite of the fact that grown up children have their own sources of income, they notoriously influence their parents' consumer behavior. That is why, it is not enough to consider their influence only in their early years of life. Besides, the decision making process of households is one of the most important topics analyzed in the consumer behavior science. The previous research concerns, among others, administering monetary means in households, the amount and the purpose of the allowance or the influence of young children on their parents' shopping decisions.

The main research problem of this paper is how and to what extant adult children influence the shopping process of their parents. In order to find an answer to this question, quantitative research on the sample of 100 children (over 18) and 100 parents was conducted. Both children and parents were included into the research sample to investigate the differences in the assessment of the level children's influence on consumer decisions of their parents between both groups.

## 2. THE INFLUENCE OF CHILDREN ON THEIR PARENTS' SHOPPING DECISIONS

The influence on parents takes place in a situation when at the request and under pressure of a child parents indulge their whims by purchasing the goods the child indicates. Marketers are aware of the importance of the influence of children when parents choose a product, so in many cases they address their promotion messages directly to them. As a result, children who are more prone to their manipulations than parents start to demand certain goods (Solomon, 2015).

Children have a significant influence on their parents' consumer decisions. Their role is noticeable while proposing certain products or services to buy, doing shopping or using the acquired products. The main factor indicating why children reach their goals does not depend on their persistence and pressure but on the type of the proposal, parents' characteristics, age of children and the course of the decision making process. The influence of children is not limited to the products meant directly for them such as sweets, snacks or cereals. They participate in choosing holidays, cars or electronic appliances (Hoyer and MacInnis, 2001, p. 382).

Attention should be paid to the fact that children often overestimate their impact on parents' decisions. In a situation when a mother or a father is particularly involved in the decision making process or is characterized by conservatism and traditionalism, the influence of the young is limited to incidental cases. The opposite situation is common among overworked or single parents who, under the pressure of time, are more prone to give in the pester power of their children. Moreover, when parents introduce a limitation on the time spent by their children on watching television, children's influence on parents gets lower (Hoyer and MacInnis, 2001, p. 382).

Blythe (2013, p. 250) distinguished eight methods in which children influence their parents: the pressure method (making threats by children); the reference to the Mighty (statement that others agreed to the request); the exchange method (a promise to do something in exchange for getting some benefits); the coalition method (looking for support among the closest people); the flattering method (making a parent happy); the rational suggestion (using logical arguments and

real evidence); the inspiring references (making references to parents' values and standards); the consultation method (a child's participation in a discussion).

According to the research conducted by Polish Program of the Service Quality (2013), 96% of Poles confirm that their children have an essential influence on their shopping decisions. Nearly one-third of them (31.2%) describe this impact as "large" and 43,6% as "average". This research shows that children's influence is dependent on their age. The older the children are, the larger the influence they have on their parents' shopping decisions. It may be caused by the fact of getting more knowledge during the years concerning available goods on the market, mainly telephones and domestic electronics. Children have an influence not only on purchasing toys but also on the choice of goods for the household, such as cars or holidays. Sixty percent of Poles declare that the choice of holidays is always consulted with their children. Children have also a great influence on the type of recreation of the whole family. They play a role in the decision process concerning such goods as furniture or clothes for parents. Besides, over 20% of the interviewees admitted that their children's suggestions have an impact on choosing a flat and 16.7% on buying a car. The reason why parents are prone to their children's suggestions is the happiness of their children. However, it may lead to making rash decisions.

The young systematically participate in making consumer decisions concerning everyday goods that may be used by the whole family. It is especially true for groceries that are often purchased a few times a week. According to the research conducted by Olejniczuk-Merta (2001, pp. 70–71), the participation of children in the decision process is not limited to the goods they will use, but their opinions are taken into consideration and they are allowed to make a final decision in many other product categories. Children's gender has an essential importance while investigating the impact they have on their parents decisions. Girls more often suggest, advise and purchase apparel, cosmetics and magazines by themselves. Boys, however, more often participate in buying sports and electronic products.

Investor Watch (2016) published a report concerning the ways in which the family and finances are seen by Generation Y and Baby Boomers. The results show the differences between the two generations' attitudes towards these topics. The Baby Boomers generation treats parents as an authority, while Generation Y regards them as friends or even peers. The representatives of Generation Y may count on financial support from their parents in many ways: health insurance (29%), buying or renting some property (29%), car insurance (26%), media (23%), holidays (19%) and funds (21%). Moreover, Generation Y is twice as much prone to come back to their family home after finishing studies. The main reason why it happens is the desire to save money. In the case of Generation Y, 73% of its representatives tend to fulfill short-term needs. They are more prone to invest in a house or buy holidays than care about their retirement and pension.

Based on the conducted review of literature, the following research hypotheses have been stated:

H1: There are differences in the assessment of the influence on the shopping decisions in a family between parents and children.

H2: The strength of the child's impact is age-related: the older the child is, the less influence she/he has.

H3: Parents from Generation X are more prone to their children's influence than parents from the Baby Boomers generation.

H4: The better the relation the parent and the child have, the bigger the child's influence on the parent's shopping decisions is.

H5: The intensity of children's influence is connected with parents' gender: children have a bigger influence on mothers than fathers.

H6: Children have an essential influence on the purchase of products destined for them and for the whole family, but they have a little impact on buying products designed only for their mothers or fathers.

## 3. DATA AND METHODS

In order to verify the above research hypotheses, a quantitative study was conducted. The invitations to the survey were sent to potentially defined respondents by e-mail. In order to gather the data effectively, the social networking sites, e-mails and Internet message boards were used. The first part of the questionnaire was directed to children aged from 19 to 39 (generation Y representatives) and consisted of 9 indices concerning the issues regarding: their general influence on parents' shopping decisions and their influence on purchasing certain categories of products. The second part of the questionnaire was directed to parents (aged from 40 to 70) and consisted of 11 indices concerning the same issues which were in the questionnaire for children.

The age of parents was intentionally adjusted to the aims of the research to include parents of Generation X and the Baby Boomers generation. In both samples (children and parents), 100 respondents were found. The characteristics of them in terms of gender and age are shown in Table 1. In order to analyze the collected data, the test of Pearson's chi-squared statistic and t-student test were used.

**Table 1**
Demographic characteristics of the respondents

| Children | | | Parents | | | |
|---|---|---|---|---|---|---|
| Gender | | Age | Gender | | Age (generation) | |
| Women | Men | | Women | Men | Generation X | Baby Boom Generation |
| 57% | 43% | 19–21 years old 33%<br>22–24 years old 37%<br>25–32 years old 30% | 55% | 45% | 62% | 38% |

Source: own research, N = 200

## 4. RESEARCH RESULTS

Beginning with the **differences in the assessment of the influence** on shopping decisions **between children and parents**, the results show that children evaluate their own influence higher than their parents. Nearly half of the children assess their influence as "high" (31%) or "very high" (15%). Moreover, only a small number of children regard their influence as minor (1%). In the case of parents, only a few assess children's influence as "very high" (2%). Most of them chose the answer "low" (30%) or "average" (28%) (see: Table 2).

**Table 2**
The differences in impact assessment between children and parents

| | Children | Parents | Pearson's chi-squared test |
|---|---|---|---|
| Very high | 15% | 2% | |
| High | 31% | 27% | $X^2 = 46.165$ |
| Average | 48% | 28% | $df = 4$ |
| Low | 5% | 30% | $p = 0.0001$ |
| Very low | 1% | 13% | |

Source: own research, N = 200

Comparing the results of children and parents, a significant asymmetry in their assessment can be noticed. Children evaluate their influence much higher than it is assessed by their parents. This confirms the first research hypothesis (H1), which stated that there are differences in the assessment of influence between children and parents.

The analysis of the **relation between intensity of a child's influence and his/her age** shows that the percentage (30%) of children describing their influence as "very high" is the largest in the youngest age group (19 to 21 years old). The shares of older children belonging to the age groups 22–24 and 25–32 who described their influence as "very high" are only 8% and 7% respectively (see: Table 3). It means that younger children much more often than older ones regard their influence as a significant one. It is a very interesting result because in the case of younger children (aged from 9 to 19) quite an opposite phenomenon is observed, where the influence increases the older the child is (Hoyer and MacInnis, 2001, p. 383).

**Table 3**
Age of children and their influence on parents' consumer decisions (assessment of children)

| The overall impact of children | Age | | | Pearson's chi-squared test |
|---|---|---|---|---|
| | 19–21 years old | 22–24 years old | 25–32 years old | |
| Very low | 0% | 2,7% | 13% | |
| Low | 3% | 0% | 0% | $X^2 = 22.034$ df = 8 p = 0.005 |
| Average | 33.33% | 48.65% | 63% | |
| High | 33.33% | 40.54% | 17% | |
| Very high | 30.3% | 8.11% | 7% | |

Source: own research, N = 200

The conducted analyses confirmed the second research hypothesis (H2) indicating the influence of a child's age on parents' consumer decisions. The age of a child is negatively correlated with the child's influence, which means that the older the child is, the less influence he or she has. The cause of the obtained result might be the fact that older children from Generation Y are independent and live outside the family home. They often have their own families to which they devote more their free time than to parents. The contact between children and parents weakens with the child's age, which causes an incidental influence of older children on consumer shopping decisions of their parents.

The analysis of the data concerning **the differences in estimating the influence of children on the shopping decision making between parents from generation X and Baby Boomers** shows that the highest percentage of the respondents from the Baby Boom generation described the influence of a child as "low" (34%) or even "very low" (32%), while the responders from Generation X assessed it as "average" (34%) or "high" (34%). A small percentage of younger parents (2%) describe the influence of a child as "very low". Yet, none of the parents from the Baby Boom generation regarded the children's influence as "very high" (see: Table 4).

**Table 4**
The relation between parent's generation and children's impact assessment

| The overall impact of children | Generation | | Pearson's chi-squared test |
|---|---|---|---|
| | Generation X | Generation Baby Boom | |
| Very low | 2% | 32% | |
| Low | 27% | 34% | $X^2 = 22.723$ |
| Average | 34% | 18% | df = 4 |
| High | 34% | 16% | p = 0.0001 |
| Very high | 3% | 0% | |

Source: own research, N = 200

The conducted analysis confirmed the third research hypothesis(H3), concerning the existence of differences in the assessment of the influence of children made by parents from Generation X and the Baby Boom generation. Children whose parents belong to Generation X have more influence on their shopping decisions than children whose parents belong to the Baby Boom generation.

Regarding **the impact of the quality of child-parent relation on a child's influence on parents' shopping decision**, the average quality of family relations was 3.45 (on the 1 to 5 scale) for parents from Generation X and 2.82 for parents from the Baby Boom generation. The research results show a positive correlation between this index and the intensity of a child's influence (see: Table 5).

**Table 5**
Generation of parents and the index of family relations

| | t | df | P |
|---|---|---|---|
| Generation/ index of the quality of family relations | 4.663 | 98 | 0.0001 |

Source: own research, N = 200

It appears that more liberal relations between a child and a parent cause a bigger child's influence on the parent's shopping decision making process. Nowadays, the distance between parents and children is narrowing. A child is more often treated by parents as a friend than a child who has to be brought up. The consequence is that a child has more autonomy in making shopping decisions. The reason for this phenomenon might be that parents continuously want to make their child happy even at the expense of a financial loss. The conducted analyses showed that relations in a family where a parent belongs to Generation X are friendlier than in the case of the Baby Boom generation. Parents of Generation X represent a much liberal and democratic model of the family, while parents of the Baby Boom generation are more autocratic. Comparing the characteristics of the generations, it can be clearly stated that the quality of family relations affects children's influence on parents' consumer behavior. Based on the presented data, it may be stated that the fourth research hypothesis (H4) was confirmed.

Another hypothesis (H5) concerned **the relations between a parent's gender and the intensity of a child's influence**. The analysis of the gathered data showed that the highest percentage of mothers estimated a child's influence as average (40%) and another 29% of women admitted that children have a high influence on their shopping decisions. Contrary to this, the biggest percentage of men declared that a child's influence is "low" (42%) and only 24% of fathers estimated it as "high". What is interesting, none of the women indicate that a child has a "very high" impact on her shopping decisions, while this option was chosen by 4% of men (see: Table 6).

**Table 6**
The relation between parent's gender and the impact of a child on shopping decisions

|  | Women | Men | Pearson chi square test |
|---|---|---|---|
| Very high | 0% | 4.4% |  |
| High | 29.1% | 24.4% | $X^2 = 13.413$ |
| Average | 40.0% | 13.3% | $df = 4$ |
| Low | 20.0% | 42.2% | $p = 0.009$ |
| Very low | 10.9% | 15.6% |  |

Source: own research, N = 200

The fifth research hypothesis (|H5) was confirmed as the existence of statistically significant differences in the assessment of a general child's influence by mother and father was proved.

The last hypothesis (H6) concerned **the relation between the intensity of a child's influence and the type of a purchased product**. Four product categories were analyzed: destined for children, mother, father and the whole family. Over half of the young people indicated that they have a "very high" influence on the choice of a product addressed to them (52%) and about one-third described it as "high" (30%). It means that a significant majority of young people are convinced that their influence on the choice of the product addressed to them is significant (see: Table 7).

**Table 7**
Product categories and the impact of children on the shopping decision

| | Product category | | | |
|---|---|---|---|---|
| | For children | For mother | For father | For family |
| Very high | 52% | 11% | 8% | 20% |
| High | 30% | 29% | 25% | 37% |
| Average | 10% | 40% | 32% | 37% |
| Low | 6% | 11% | 26% | 4% |
| Very low | 2% | 9% | 9% | 2% |

Source: own research, N = 200

As far as products designed for mothers are concerned, a significant majority of young people described their influence as "average" (40%) or "high" (29%), and in the case of the products for fathers, the biggest percentage of young people estimated their influence as "average" (32%) or "low" (26%). The last product category is the one intended for the whole family. In this case, children estimated their influence as "average" (37%) or "high" (37%). Summing up all the above results, the last research hypothesis (H6) was confirmed. Children have the biggest influence on buying products addressed to them or the whole family and the child's influence on purchasing products for mothers is bigger than on purchasing products for fathers.

# 5. DISCUSSION

The aim of the conducted research was to examine the influence of children from Generation Y on the consumer decision making process of their parents.

The research hypothesis about the existence of differences in the assessment of the influence made by parents and children was confirmed. Children consider their influence as more

considerable than parents. On the one hand, a lot of parents make their children believe that they have a large influence on their shopping decisions because they do not want the child to feel rejected (Hoyer and MacInnis, 2001, p. 382). That may be a reason why children overestimate their real influence. On the other hand, parents may underestimate their children's influence for fear of losing authority in a child's eyes.

Another hypothesis concerned the relation between a child's age and his or her influence. It was confirmed that the influence of a child under 19 is negatively correlated with age. The reason why this phenomenon appears is that older children are more independent and live outside the family home. Thus, their contact with parents weakens and only occasionally do they have a chance to influence their parents' consumer decisions.

The hypothesis stating that parents representing Generation X are more prone to the influence of their children than parents from the Baby Boom generation was confirmed. It should be noticed that children of the representatives of the Baby Boom generation are older and exert less influence on parents than it happens in the case of children of parents from Generation X. The older a child is, the more occasional influence he or she exerts on parents. The differences in the assessment of children's influence may also derive from the characteristics of these two generations. The representatives of the Baby Boom generation are traditionalists. According to them, the family household is based on the traditional splitting of roles where a woman is a mother and a wife. Similarly interpreted is the role of a child, whose main duty is the execution of orders imposed by parents. Therefore, parents do not let children make individual decisions and often ignore their opinions (Dziewanowska and Kacprzak, 2013, p. 54). It is quite opposite in the case of parents from Generation X. The representatives of this cohort experienced a certain revolution, which made them give up the conservatism and the traditionalism of the previous generation. That is why, their relations with children have become friendlier. Those parents regard their children as the most important members of the family and allow children to decide in many aspects concerning not only their own lives but also the ones of their parents (Van Den Bergh and Behrer, 2011, pp. 22–24).

The analysis of the research results also shows that the better the quality of the relations between children and parents is, the bigger influence on parents' shopping decision a child has. Nowadays, the distance between an adult and a child is reduced, which is why children have more autonomy and the happiness of their child is the most important to parents (Tapscott, 2008).

The hypothesis regarding the influence of a parent's gender on the assessment of the influence of a child was confirmed. Mothers declared higher children's impact on their shopping decisions than fathers. The reason may be that mothers are more submissive to the instigation of children. Children also more often accompany their mothers than fathers during the shopping and thanks to that they have more opportunity to influence them.

The analysis of the respondents' answers also confirmed the last hypothesis stating that children have the biggest influence on purchasing products designed for them and for the whole family. Their limited knowledge restricts their influence on purchasing products for other members of family.

## 6. LIMITATIONS AND FURTHER RESEARCH

The first limitations of the study that should be taken under consideration is undoubtedly the unrepresentative sample of respondents. The research was conducted on a relatively small and not randomly chosen sample of 100 parents and 100 children, which is why it should be treated as exploratory and repeated on a larger and representative group of respondents. Another limitation of the study is of psychological nature. Parents unwillingly admit that their children are brought up in a liberal way and they co-decide in all aspects of the family life. The children might also

have inaccurately defined the level of their influence. It is the parent who finally makes consumer decisions and it is hard to estimate the real influence of a child.

The subject of a child's influence on parents' consumer decisions was mostly researched on the group of children up to 18 years old. Yet, it must be remembered that nowadays children leave their family home later than before and still even after leaving home they affect their parents' decisions. Currently, young people make up a meaningful market activity group. Not only do they administer their own funds, purchase goods for themselves but also influence the family shopping. Deepening the knowledge about these phenomena may contribute to more accurate advertising.

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